DECEMBER 2, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

New Caution in '58 Labor Demands?

Autoworkers show faint signs of moderation, but they'll still seek a 40-cent package, plus the short week — Page 53

✔ **Appliance Outlook Through '67 . . . Page 56**

✔ **Short Run Dies Last Longer . . . Page 94**

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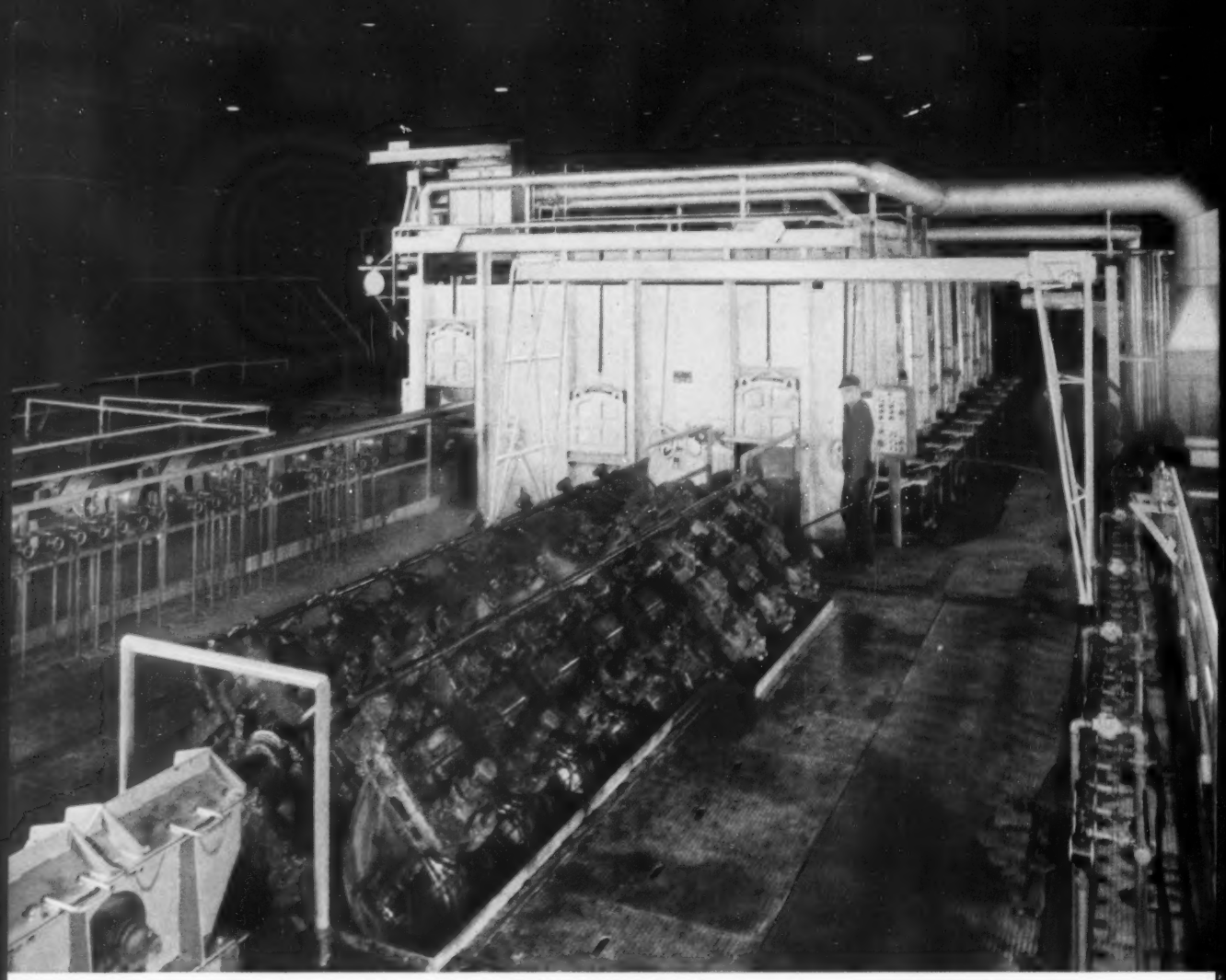


Aetna-Standard Stretch Reducing Mill built for The Colorado Fuel & Iron Corporation, Pueblo, Colorado.

STRETCH REDUCING - tonnage producer

Stretch Reducing makes existing Seamless Tube Mills more productive!

For Example: To make a given number of tubes in small sizes by Stretch Reducing requires only one-fourth the number of billets.

The billets are larger and therefore easier to handle on a mill designed to produce larger O.D.'s.

Because of the decrease in number of billets required to produce a specific footage of tubing, 50% to 75% of the time previously required for the production of tubing can be scheduled for the production of larger and heavier pipe sections.

How much additional equipment is needed? What are the costs? What will be the yield? How much will be saved in costs? Those and many other questions can be answered by Aetna-Standard who have built and are building most of the Stretch Reducing Mills.

AETNA • STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. PLANTS: ELLWOOD CITY, PA., WARREN, OHIO

CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC

XXV

This is the twenty-fifth of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Thermal Stress-Relieving of Alloy Steels

In the production of alloy steel bars and parts made of alloy steel, stresses are sometimes set up, and these stresses must be relieved before optimum results can be expected. Two general types of stress-relieving are practiced—thermal and mechanical. In this discussion we shall consider only the former.

There are several important reasons for thermal stress-relieving. Among these are the following:

(1) The first and most fundamental purpose is to reduce residual stresses that might prove harmful in actual service. In the production of quenched and tempered alloy steel bars, machine-straightening is necessary. This induces residual stresses in varying degrees. Bars are usually stress-relieved after the straightening operation. When the bars are subjected to later processing that sets up additional stresses, subsequent stress-relieving may be necessary.

(2) A second major purpose of thermal stress-relieving is to improve the dimensional stability of parts requiring close tolerances. For example, in rough-machining, residual stresses are sometimes introduced, and these should be relieved if dimensional stability is to be assured during the finish-machining.

(3) Thermal stress-relieving is also recommended as a means of restoring mechanical properties (especially ductility) after certain types of cold-working. Moreover, it is required by the "safe-welding" grades of alloy steels after a welding operation has been completed.

Alloy bars are commonly stress-relieved in furnaces. Temperatures under the transformation range are employed, and they are usually in the area from 850 deg to 1200 deg F. The amount of time required in the furnace will vary, being influenced by grade of steel, magnitude of residual stresses caused by prior processing, and mass effect of steel being heated. After the bars have been removed from the furnace, they are allowed to cool in still air to room temperature.

In the case of quenched and tempered alloy bars, the stress-relieving temperature should be about 100 deg F less than the tempering temperature. Should the stress-relieving temperature exceed the tempering temperature, the mechanical properties will be altered.

Items other than bars (parts, for example) can be wholly or selectively stress-relieved. If the furnace method is used, the entire piece is of course subjected to the heat; selective relieving is impossible. However, if a liquid salt bath or induction heating is used, the piece can be given overall relief or selective relief, whichever is desired.

Detailed information about stress-relieving is available at all times through Bethlehem's technical staff. Feel free to consult with our metallurgists, who will cooperate fully without cost or obligation on your part. And remember that Bethlehem can furnish the entire range of AISI standard alloy steels, as well as special-analysis steels and all carbon grades.

If you would like reprints of this series of advertisements from No. I through No. XX, please write to us, addressing your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa. The first 20 subjects in the series are now available in a handy 36-page booklet, and we shall be glad to send you a free copy.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

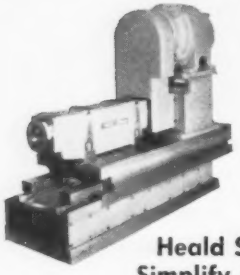
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Here's Why

BORE-MATIC VERSATILITY SAVES MONEY

on Any Automated Production Line



When the time comes for a job changeover, you can do it at a saving with Heald Bore-Matics

Heald Slide Units Simplify Automation

The Heald *Slide-Unit* is the basic "building block" of an automated Bore-Matic production line. This simple, compact, hydraulically operated unit, complete with boringhead and drive, can be mounted in any position and can approach the work from any angle. It can be tooled for any desired operations — from roughing to precision finishing.

Because each Slide Unit is a separate and completely self-contained machine—arranged through interlocking control circuits to function as a fully automatic segment of the entire production line — individual machines can be added as required.

THE versatility of a Heald Bore-Matic has often been cited in terms of the machine's ability to perform a number of operations simultaneously. But this basic versatility has another advantage—one that is particularly important where large, automated equipment is involved. It *protects your investment* against the danger of early obsolescence!

For example, a Heald automated production line consists of the required number of *basically standard* Bore-Matics — tooled up to perform the required operations on a specific part. The machine becomes "special" only where part design requires it. Upon completion of the job for which the machine was designed, it can usually be re-tooled and put to work on a brand new operation — with a minimum of structural changes. This simplicity and economy of job changeover eliminates much of the "risk" in planning a long-term investment in automated equipment.

If you want a production line that's *protected against obsolescence*, talk to your Heald representative about Multi-Unit Bore-Matics, another example of why *It Pays To Come To Heald.*

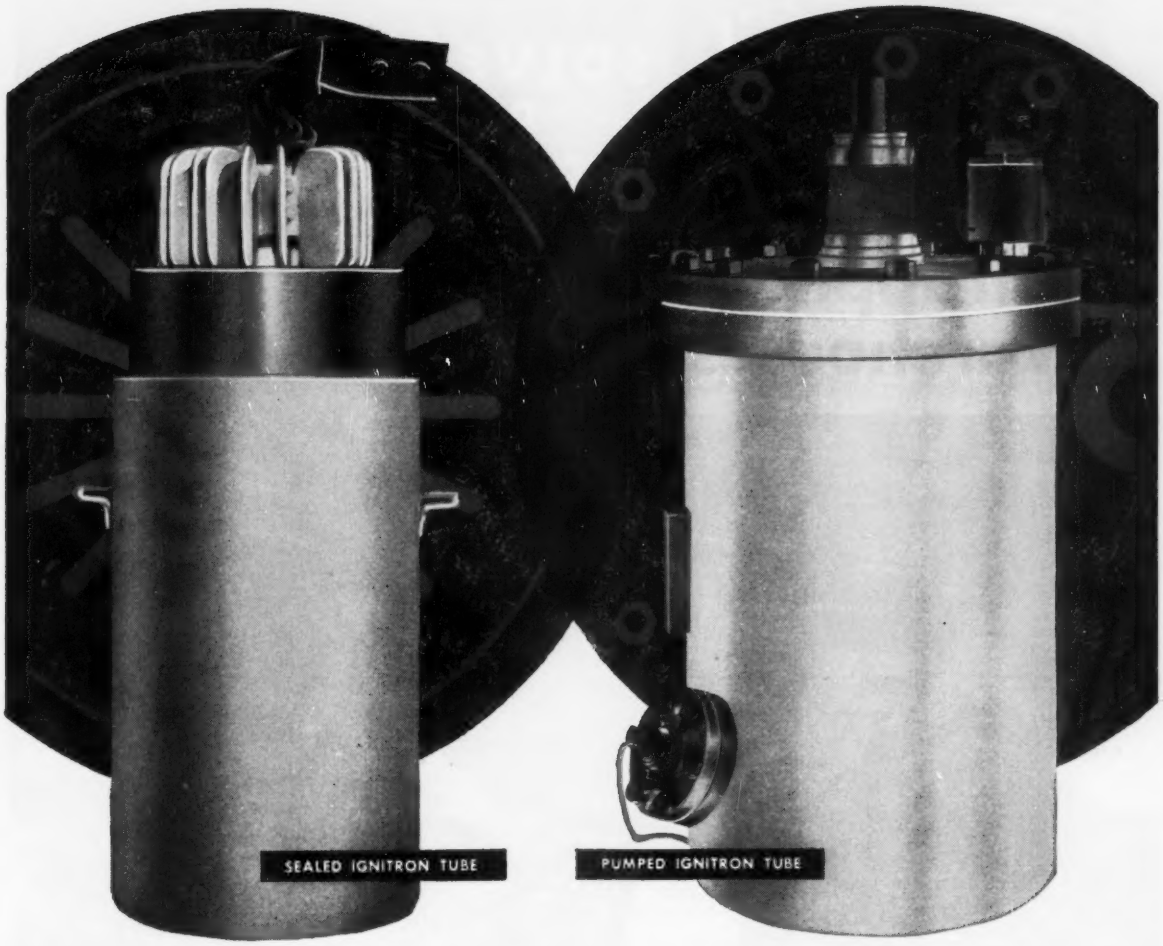
HEALD®

THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York



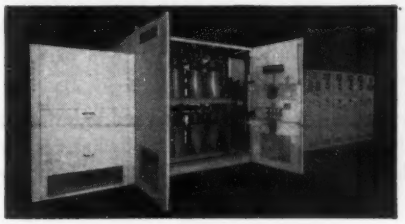
5 MILLION KW's CAN'T BE WRONG
...IGNITRONS ASSURE RELIABLE D-C POWER

Behind this unequalled record for reliable d-c power is the Westinghouse-invented and perfected Ignitron tube.

There are no major moving parts . . . no brushes, commutators or collector rings to wear and replace. Continuity of power is further assured by its high overload capacity. The Ignitron can repeatedly handle high load swings without increased maintenance.

And in addition to a trouble-free design, the Westinghouse Ignitron rectifier is relatively unaffected by a-c system disturbances—instantly available and never requires synchronizing. Because of these and other advantages, more than 5,000,000 kilowatts of Ignitrons have furnished reliable d-c power to plants in the steel and general industries.

Ask for your copy of Ignitron booklet B-7008. It describes such outstanding features as compactness, safety and low installation cost. Contact your Westinghouse representative or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-15006



Ignitron Unit Substation showing anode breaker, Ignitron rectifier and d-c switchgear

YOU CAN BE SURE...IF IT'S

Westinghouse

Brainard Nationwide Strapping Warehouses

SOLVE THE BUYING PUZZLE FOR STRAPPING BUYERS

Brainard's strapping warehouses strategically placed throughout the United States insure quick delivery of tensional and heavy duty strapping as well as tools and other strapping supplies.

For this reason, small to medium sized industries that buy in relatively small quantities have found that Brainard's service and delivery are topped only by the quality of their product.

Brainard Steel Strapping

SHARONSTEEL

Brainard Steel Division, Sharon Steel Corporation
Griswold Street, Warren, Ohio

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STEEL
The Metalworking Weekly

December 2, 1957
Vol. 141 No. 23

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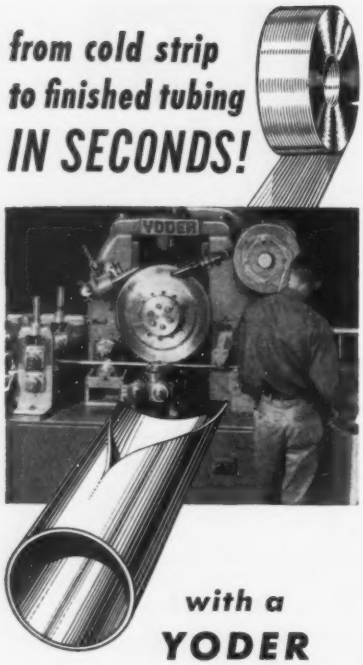
Index available semiannually. STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

from cold strip to finished tubing
IN SECONDS!



with a
YODER ELECTRIC-WELD TUBE MILL

One of the fastest . . . and one of the least expensive . . . methods of making steel tubing is with a Yoder Electric-Weld Tube Mill. The Yoder method eliminates the need for time-consuming heat treatments and costly conditioning furnaces for most tube needs. Scrap losses, too, are far lower than any other method . . . usually less than 2%.

The Yoder Type-M Mill shown above is operated by one man and a helper. Coiled strip on this mill is continuously cold-roll formed, welded and cut to required lengths in a matter of seconds . . . at speeds up to 340 f.p.m. The quality of the resulting tube is *constantly* better than the requirements of commercial standards. This is one of many reasons why manufacturers and users of tubing the world over are using more Yoder mills than all other makes combined.

If your business requires pipe and tubing, ferrous or non-ferrous, in sizes from ¼-inch up to 26-inch diameter, Yoder can supply the engineering service and machines to produce it faster and better for less! For complete details, write for the Yoder Tube Mill Manual. It's yours for the asking.

THE YODER COMPANY
5502 Walworth Ave. • Cleveland 2, Ohio

ENGINEERING YODER MANUFACTURING
PIPE AND TUBE MILLS
(ferrous or non-ferrous)

behind the scenes

En Garde, Le Pentagon!

He who leadeth with his chin frequently windeth up sporting lumps. This time, however, in spite of our mousey attitude, we are about to pitch into U. S. Government.

STEEL had a wonderful story about missiles a few weeks ago. It would have been of particular interest to the metalworking world. We even had a picture of Associate Editor Austin Brant peering from a window in the tail of a rocket. Pictures of this rocket have been published before; perhaps thousands of persons are familiar with the metal fabrication of the thing, and it's even more than possible that the Russians know all about it, anyway. Worse than that, the Russians probably regard it as old hat. They're already shooting for the moon, and we are scarcely off the ground.

Well, after allowing STEEL to assemble the story, the Pentagon suddenly did a double take, reversed itself, and declared the article off limits, top secret, extra confidential, and intimated that if we printed it we would be better off in a sputnik. We don't question the Pentagon's authority, nor will we ever fail to conform with its rulings, but . . .

We Tote Heavy Load

Old wine, old cheese, old friends, and old chestnuts have an ever-lovin' flavor. When George O. Hays, president, Penton Publishing Co. (publisher of STEEL) came across the following lament in the Building Trades Employers' Association *Bulletin*, he grinned as happily as he did when he first saw it—possibly when he was teaching school in rural Indiana. Titled "Executive Manager's Lament," the piece goes:

Population of U. S.	160,000,000
People 60 years and older	62,000,000
Balance left to do the work	98,000,000
People 21 years and younger	54,000,000
Balance left to do the work	44,000,000
People working for government	21,000,000
Balance left to do the work	23,000,000
People in Armed Forces	10,000,000
Balance left to do the work	13,000,000
People in city and state offices	12,800,000
Balance left to do the work	200,000
People in hospitals, institutions	126,000
Balance left to do the work	74,000
Bums and others who don't work	62,000
Balance left to do the work	12,000
Persons in jail	11,998
Balance left to do the work	2

Two! You and I. And you'd better get a move on. I'm tired of running this country alone!

Caution in Labor?

That mess of traffic lights on the front cover suggests that Labor ought to use caution before it barges ahead with new demands. The story (Page 53) lists Labor's gains, examines its prospects, and brings the reader up to date on bargaining points. There's some mention, too, about a strike the UAW may pull next June, probably against General Motors. From a quick reading of the article, we learned that Labor is quite concerned about its internal strife, Congressional hearings, and unwanted officers. Automation, electronics, atomic power, shifts of employment, and dips in the national economy help influence Labor at the bargaining table—and it's lucky they do, too, because otherwise Labor would demand the table, as well.

They Asked for It

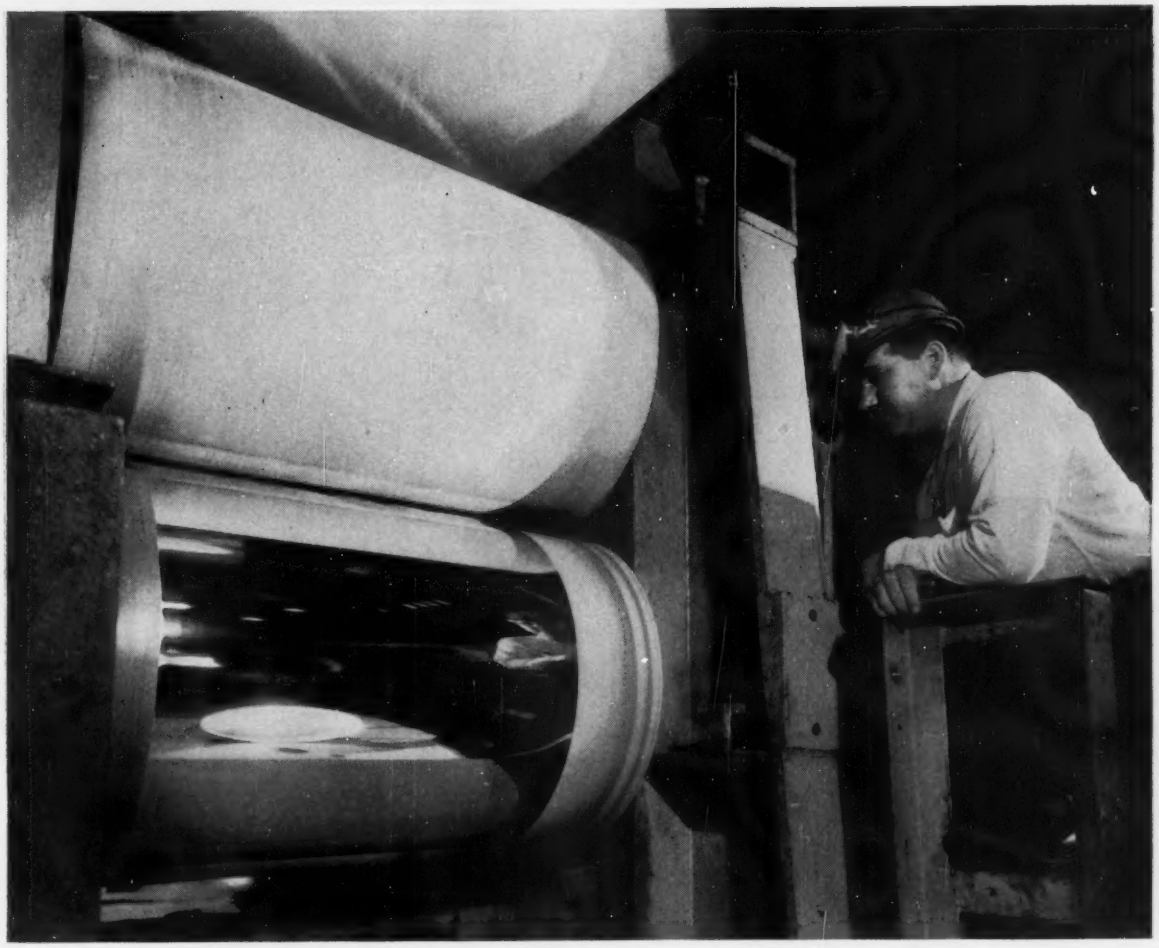
Miss Bernice Hunter is librarian at Rayonier Inc., Olympic Research Div., Shelton, Wash. Among the magazines that cross her desk each month is *Automation*, a sister publication of STEEL. In the November issue the editor, in a burst of generosity, invited his readers to submit their knottiest automatic operation problem to the *Automation* Problem Forum. The invitation was headed "What's Your Problem?" Miss Hunter didn't dawdle around; she unlimbered her typing machine and wrote this beautiful note: "Gentlemen: On Page 69 of the November issue of *Automation* is the question, 'What's your problem?' Our problem is that Pages 37-68 of this issue are alternately blank and double printed."

When last seen, the editor was in a sinking condition.

Shrdlu

(Metalworking Outlook—Page 47)

B.F.Goodrich report:



Rubber stays dull to keep tin plate shiny

B. F. Goodrich improvements in rubber brought extra savings

Problem: Those are tension bridle rolls on a high-speed electrolytic tin plating line. Their job is to keep a continuous strip of steel moving through the line under controlled tension so that it neither buckles nor stretches too tight.

But for years, these rubber-covered rolls were a terrific headache in steel mills. After just a few hours, the rubber was polished smooth and shiny with rubbing plus high speed. Then the rolls couldn't grip, the steel smeared and couldn't be used for tin cans.

What was done: B.F.Goodrich engineers worked on the problem, and came up with a new, improved rubber compound. Rolls covered with this special rubber don't glaze, don't slip, don't mar the finish of the plate.

Savings: At the mill shown above, B.F.Goodrich Strip-Grip rolls last 100 per cent longer than the rolls previously used. The appearance of the tin plate has been consistently good.

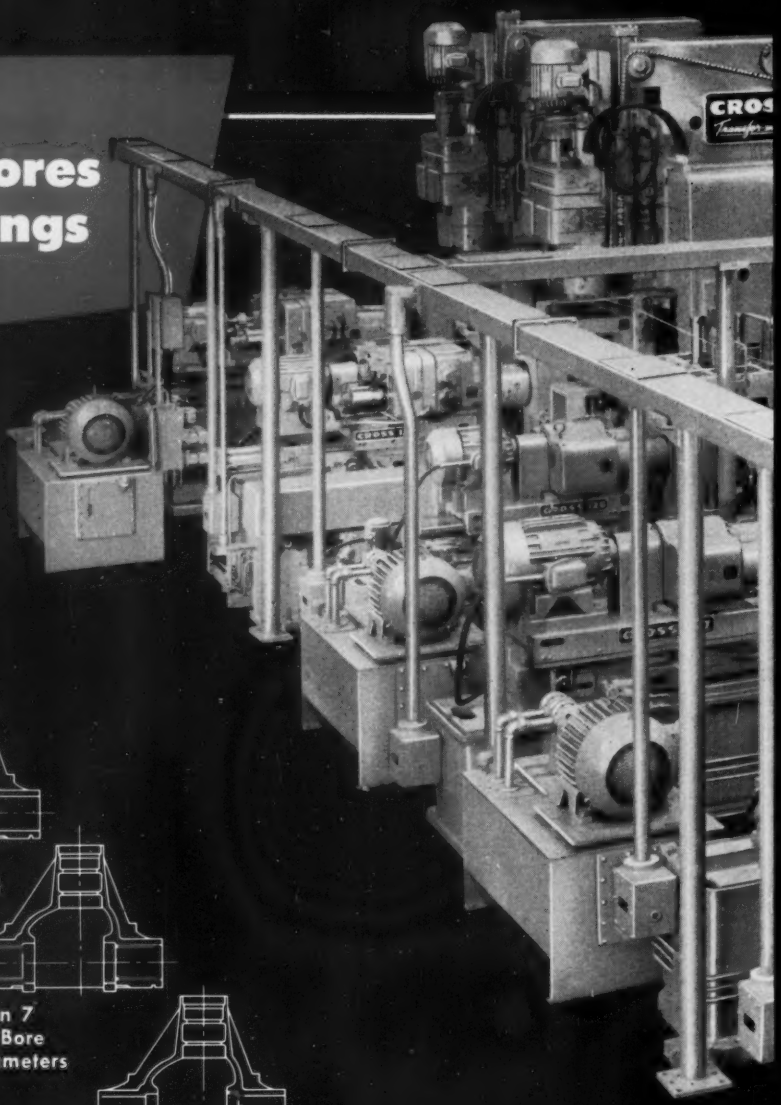
Extra benefits: Maintenance costs have gone way down, too. That's because the roll cover keeps its dull finish permanently. Strip-Grip rolls have operated for periods of three or four months without maintenance of any kind, in mills where conventional rolls needed almost daily attention.

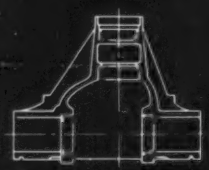
Where to buy: B.F.Goodrich distributors have full information on the steel mill rolls described here. And, as factory-trained specialists in rubber products, they *can* answer your questions about *all* the products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-221, Akron 18, Ohio.*

B.F.Goodrich

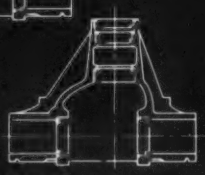
INDUSTRIAL PRODUCTS

Precision Bores Axle Housings

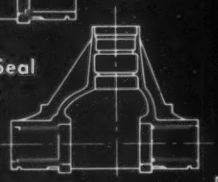




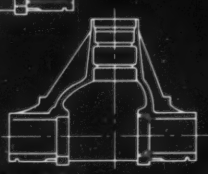
Station 11
Finish Bore
Four Bearing Seats



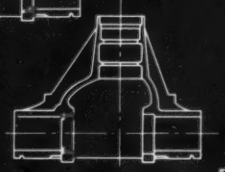
Station 9
Semi-Finish Bore Oil Seal
and Bearing Seats



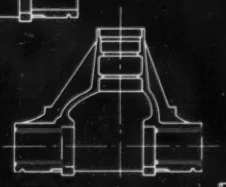
Station 7
Finish Bore
Tube Diameters



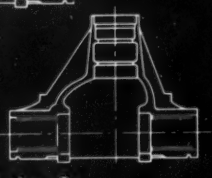
Station 5
Rough Back-bore
Right Side



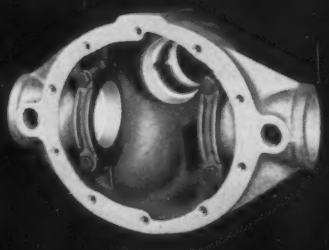
Station 4
Rough Back-bore
Left Side



Station 3
Semi-Finish Bore
Tube Diameters

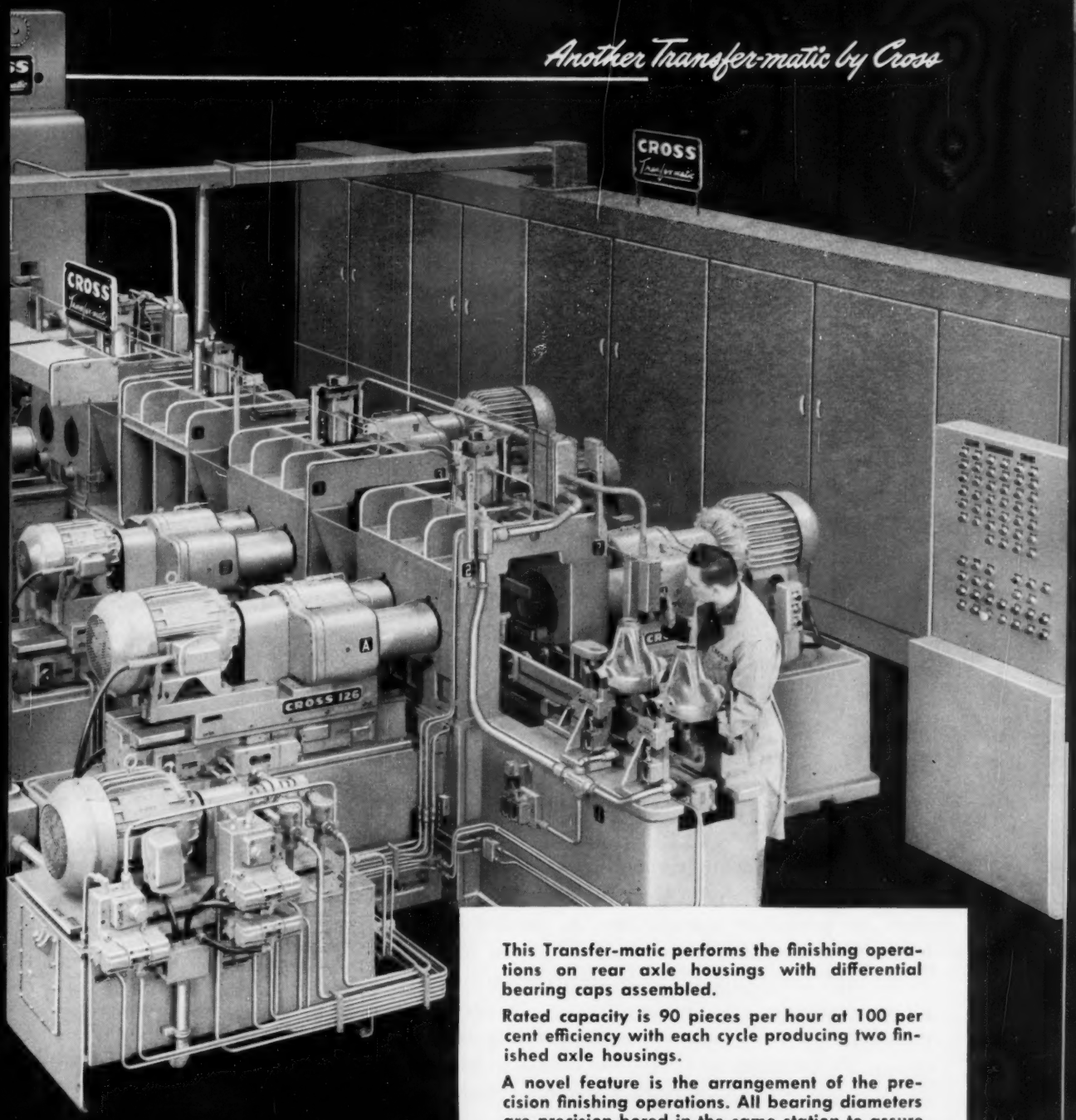


Station 2
Rough Bore
Tube Diameters



Station 1
Load Two Parts

Another Transfer-matic by Cross



This Transfer-matic performs the finishing operations on rear axle housings with differential bearing caps assembled.

Rated capacity is 90 pieces per hour at 100 per cent efficiency with each cycle producing two finished axle housings.

A novel feature is the arrangement of the precision finishing operations. All bearing diameters are precision bored in the same station to assure precise gear centers. The vertical boring unit finishes first one and then the other of the two pinion shaft bearing diameters. In the same station, opposed horizontal units back-bore the differential bearing diameters. Perfect concentricity and squareness of the shoulders are obtained between the two pinion bearing seats since both are bored with the same spindle.

Other features are complete interchangeability of all standard and special parts for easy maintenance, construction to JIC standards, hardened and ground ways, hydraulic feed and rapid traverse and automatic lubrication.

Established 1898

THE CROSS CO.

First in Automation

PARK GROVE STATION • DETROIT 5, MICHIGAN

KILL RECORD VAULT FIRES FAST

with a Kidde automatic carbon dioxide fire extinguishing system . . . the fastest, safest 'round-the-clock fire protection you can buy. At the first hot breath of fire, Kidde's rate-of-temperature-rise actuators trigger the system. Instantly, clean carbon dioxide smothers fire, vanishes into thin air. Leaves no mess. The Kidde system features all operating parts completely enclosed for safety. No falling weights, no clumsy mechanical triggering methods. Pressurized, no outside power needed. Visual indicators to show if system is set or released. Easy testing of all operating parts. No parts to replace after operation or test. For more information write for Kidde's automatic carbon dioxide fire extinguishing systems booklet today.

Kidde

Walter Kidde & Company, Inc.
1260 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd., Montreal—Toronto

LETTERS
TO THE EDITORS

Editorials To Be Mailed

Please send 1325 copies of your excellent editorial, "Don't Run for the Hills!" (Nov. 4, Page 63). We plan to mail these to our distributor-salesmen.

W. S. Butler
Superior Tube Co.
Norristown, Pa.

I read with interest your timely editorial, "Why Not a Profit?" (Oct. 21, Page 35). We have a mailing list of about 100 reinforcing steel fabricators in the seven western states, and I would like to send each of them a copy.

F. S. Clough
Manager
Western Reinforcing Steel Fabricators Association
Oakland, Calif.

Quotable Article

Please mail a copy of the article, "Needed: Better Training" (Nov. 18, Page 114). I'm sure you won't mind my quoting from it when talking to engineering groups.

E. W. Allardt
Chief Engineer
Tubular Products Div.
Babcock & Wilcox Co.
Alliance, Ohio

Small Business Going Places

I enjoyed the Program for Management article, "Small Business—Its Place in Our Future" (Nov. 11, Page 99), and think that you did a splendid job of presenting it.

James G. Garwick
Regional Director
Region VI
Small Business Administration
Cleveland

Ideal Information

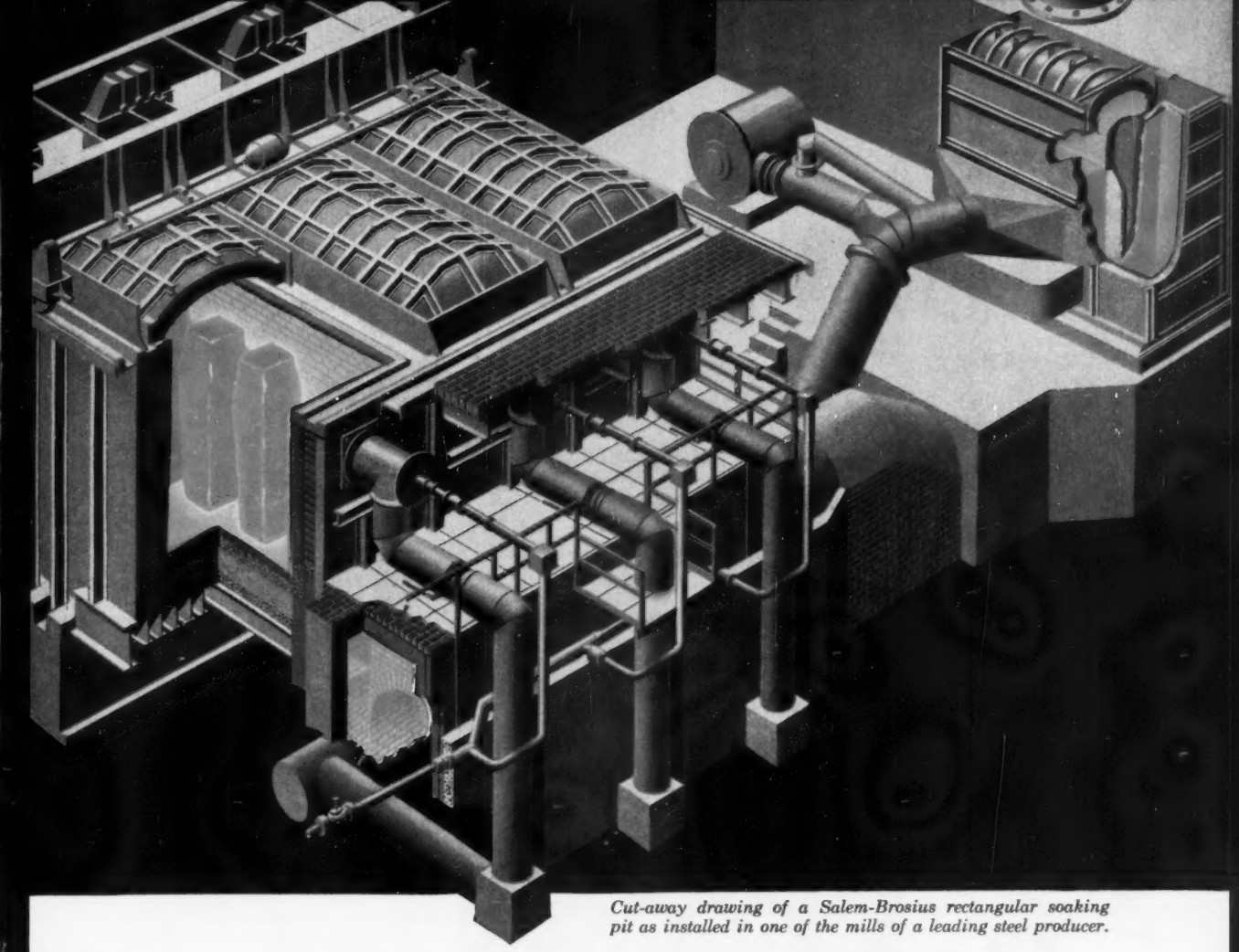
Could you please send a copy of the two-part article, "How To Avoid Cracking Die Steels" (Sept. 30, Page 79, and Oct. 7, Page 200)? I'm a diemaking apprentice instructor at Pratt & Whitney Aircraft, and this is ideal information for our apprentice diemakers.

James R. Sultor
Pratt & Whitney Aircraft
Division of United Aircraft Corp.
East Hartford, Conn.

Usage at Policy Meeting

Please forward 25 copies of the article, "Pattern Bargaining Spreads" (Nov. 11, Page 59). I plan to use them at the next meeting of the management policy committee of the National Metal

(Please turn to Page 12)



Cut-away drawing of a Salem-Brosius rectangular soaking pit as installed in one of the mills of a leading steel producer.

Users are the best salesmen of Salem-Brosius soaking pits

"We have again specified Salem-Brosius rectangular soaking pits for our expansion program," reports an operating official of a major steel company using pits installed by several manufacturers. "The previous installation heated more steel ingots ready for rolling with less fuel consumption, less maintenance cost, and better temperature uniformity than any other type of pit in our plant."

Reports like this are typical, not only about these rectangular soaking pits, but all other Salem-Brosius heating and heat-treating furnaces as well. Salem-Brosius engineers, both here and abroad, possess an enviable record for designing furnaces which produce maximum, high-quality output at minimum operating cost. If your expansion or modernization plans call for ingot soaking pits or any other heating or heat-treating furnaces, Salem-Brosius, Inc. would appreciate an inquiry.

SALEM-BROSIUS, INC.

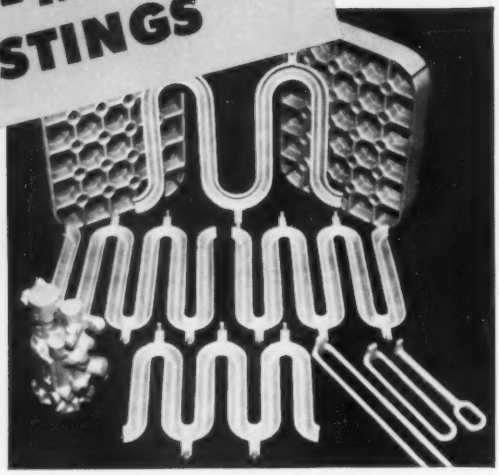
CARNEGIE, PENNSYLVANIA

In Canada: Salem Engineering Limited, 1525 Bloor Street West, Toronto, Ontario

Announcing

a significant broadening of
Duraloy High Alloy Casting Service...

SHELL-MOLDED CASTINGS



DURALOY

We are now in position to accept and process substantial orders for shell-molded castings in the Chrome Iron, Chrome Nickel class.

Shell-molded castings provide several values over conventional castings:

a . . . dimensions are exceptionally accurate
b . . . thinner walls are practicable
c . . . surface finish is superior

Shell-molding is ideal for mass or repetitive production of parts particularly those with intricate design.

With our conventional static and centrifugal casting service now broadened by our shell-molded casting service, we are in a better position than ever to serve industry in connection with its high alloy casting requirements. May we quote on your casting requirements that call for shell-molding?

The DURALOY Company

OFFICE AND PLANT: Scottdale, Pa.

EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
ATLANTA OFFICE: 76—4th Street, N.W.
CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

LETTERS

(Concluded from Page 10)

Trades Association, of which I am president.

Warren W. Walker
General Manager
Graphite Metallizing Corp.
Yonkers, N. Y.

Editorial Hits Home

I recently visited an account that had taken time to frame and hang on the wall your July 15 editorial, "Parable of the Prices" (Page 51). Will you mail me several copies? The article hit home, and I enjoyed it immensely.

Edward J. Foy
Manager
Westbury Office
Morris Abrams Inc.
Westbury, N. Y.

Indian Appreciates Value

In regard to your article in full color, "How To Get More from Machine Tools" (Sept. 23 insert), I have rarely come across so well written and so well printed an article with so much practical value. Kindly send a copy.

V. S. Kudva
Technical Director
Canara Workshops Ltd.
Mangalore, India

Steel Study: Excellent

Your special study in the Nov. 4 issue, "Stainless Steels" (Page 107), is excellent. Could I have a dozen copies for distribution to the major stainless users in this area?

J. R. Miller
District Sales Manager
Chicago Steel Service Co.
Appleton, Wis.

You are to be highly complimented. I find it quite accurate and highly educational. May we have two copies for our salespeople?

R. M. Conner
Manager of Sales
New York District
G. O. Carlson Inc.
East Orange, N. J.

Plan Distribution

We enjoyed the Program for Management article, "Dealing with Workers" (Sept. 16, Page 119). May we have 20 reprints of the article to distribute within our organization?

M. C. Detert
Modine Mfg. Co.
Paducah, Ky.

Helpful to Supervisors

The two-part article, "Choose the Right Lubricant" (Oct. 14, Page 132, and Oct. 21, Page 100), was most interesting. Please send five reprints. Our supervisory personnel will find the article informative and helpful.

F. C. Ballard
Manager, Plant No. 1
Reynolds Metals Co.
Louisville

Prefab Institute Address

In the Metalworking Outlook of Oct. 28 (Page 113), you make reference to the Prefabricated Home Manufacturers Institute. Can you give me the institute's address?

Charles C. Hall
Vice President-Sales
United Steel Fabricators Inc.
Wooster, Ohio

• *The institute is at 908 20th St., Washington 6, D. C.*

You learn a lot in a hundred years... especially in the hundred just passed

—the greatest century of technical progress the world has ever seen. Born as it was, on the brink of the era, the growing Bliss Company was in a position to make a number of contributions to pressed metal-working... the first inclinable press, for example, and the famous rolling key clutch, the toggle press principle, pneumatic clutches, these are some of the more important ones.

Proud? Of course we are—of these contributions and of the men who made them possible. For we've learned in our past century that: Any company, no matter what its size, is basically people... that a customer isn't a purchase order, but someone to whom we are responsible both now and in the future. This is part of what we mean when we say, "Bliss is more than a name... it's a guarantee."

BLISS
SINCE 1857

E. W. BLISS COMPANY · Canton, Ohio

100 years of making metal work for mankind

PRESSES • ROLLING MILLS • ROLLS • DIE SETS • CAN MACHINERY • CONTRACT MFG.

This **SCREW** requires ductile wire!

The superior ductility of Chase wire makes forming easier on big-head screws or rivets.

Chase makes wire

THE CHASE WIRE SERVICE MAN, W. F. Schmollinger, our wire mill superintendent, heads our team of experts...spends his time solving *your* problems. Often in the field, working with engineers and shop foremen, he has helped many manufacturers of cold-headed parts to make a finer product!

This **BOLT** requires high-strength wire!

High-strength Chase wire for square and hexagonal head bolts makes a finer quality product.

This **WOOD SCREW** requires "in-between" wire!

Some items, like wood screws, call for wire with both high strength and ductility.

to fit your product!

WHAT DO YOU NEED IN WIRE?

Ductility? High strength? Perhaps a certain amount of both? Chase makes a variety of alloys and tempers, to meet most every production requirement. But if Chase doesn't already make it, we'll *product-engineer* wire for your individual needs!

It's a unique Chase service! Although Chase wire is quality-controlled and free from imperfections, even the best wire can't do a perfect job unless it's the right alloy and temper for *you*.

So before you order wire again, get in touch with Chase. Tell us just what you do with wire ...what properties you look for...describe any problems you may be having. Send us samples or drawings of your product. By studying your individual requirements, trained Chase technicians can help you gain greater efficiency and economy in production.

Contact the Chase Wire Service Man through the warehouse or office nearest you!

Chase®

BRASS & COPPER CO.

WATERBURY 20, CONNECTICUT
SUBSIDIARY OF KENNECOTT COPPER CORPORATION

The Nation's Headquarters for Brass, Copper and Stainless Steel

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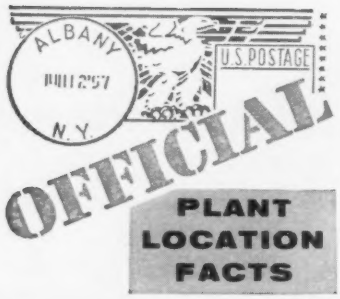

PLANT LOCATION FACTS

Financial assistance in New York State means:

Availability of the world's greatest investment firms with a continuing interest in the State's industrial progress.

Accessibility of financing throughout the State by *local* institutions.

Co-operation in obtaining suitable funds through the New York Business Development Corporation—a privately financed and managed organization chartered by the State Legislature to assist qualified new or expanding enterprises within or coming into the State.

★

Before you decide on a new plant, what specific financing data do you need?

Our job is to know where capital is available, and to put you in touch with proper sources of mortgage money or working capital for your operations in New York State.

★

Financing is only one of your factors. What about

... markets ... transportation
... components and raw materials
... sites and buildings ... power
... water ... fuel ... labor?

The New York State Department of Commerce stands ready with a professional, long-experienced staff to give you a tailor-made plant location survey covering any New York State community.

Let us answer your questions. Write for "Industrial Location Services," a free booklet that tells what we can do for you. Send your request to me at Room 677, 112 State Street, Albany 7.

EDWARD T. DICKINSON
Commissioner of Commerce

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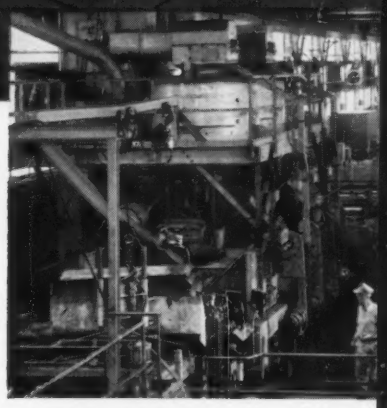
One of the most efficient manufacturing operations in industry today is the production of automobile frames. For better, faster descaling, three of the four producers in this field have selected Pangborn Rotoblast Descaling Equipment.

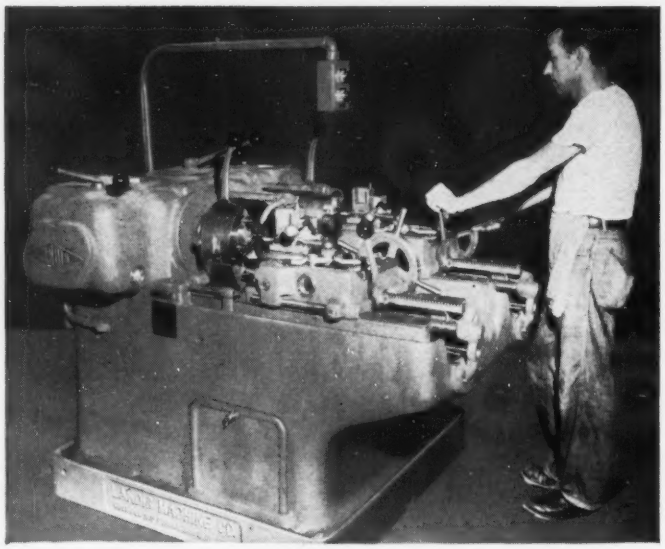


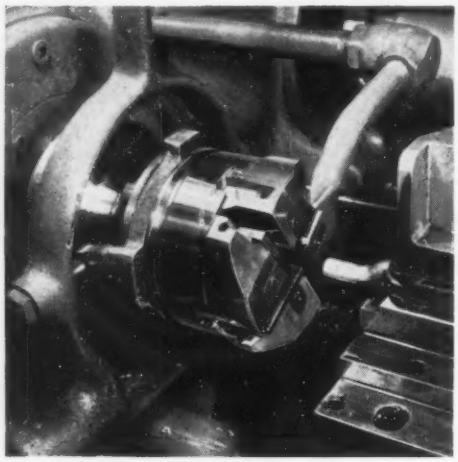
ROTOBLAST replaces pickling at Midland Steel.

Clean it fast with **Pangborn** *ROTOBLAST®*

PANGBORN CORPORATION, Hagerstown 1600, Maryland
Manufacturers of Blast Cleaning and Dust Control Equipment

FASTER TURNING Using CUTTING TOOLS Simultaneously





BY turning, facing, and chamfering on Landis Threading Machines, automotive parts production at Thompson Products in Detroit has been substantially increased. This LANDIS **Hollow Milling** technique makes large out-put increases possible by applying a number of simultaneously-functioning cutters, thus multiplying the feed rate of a single tool.

The illustrations show one of these parts, steering links, being turned and faced on a LANDMACO Double-Spindle Leadscrew Threading Machine. SAE 1040 steel forgings are turned (1/32" stock removal) 1⅛" in length and faced by four special turning cutters in ⅞" V LANCO Hardened and Ground Heads. Production regularly averages 200 pieces per hour, with the ⅝" turned diameter held within ±.004". Four hours production is obtained between cutter grinds.

This LANDIS technique offers important advantages over other methods of turning, forming, and facing. The use of four or six simultaneously-functioning cutters, in addition to increasing production, reduces tool cost and workpiece spoilage to the minimum. The diametrically-opposing cutters evenly distribute cutting strains and maintain proper work alignment. LANDIS Cutters, available in a wide variety of styles, are economical for they are usable for most of their length with only a simple regrinding of the rake angle.

LANDIS Machine COMPANY
WAYNESBORO
PENNA., U.S.A.

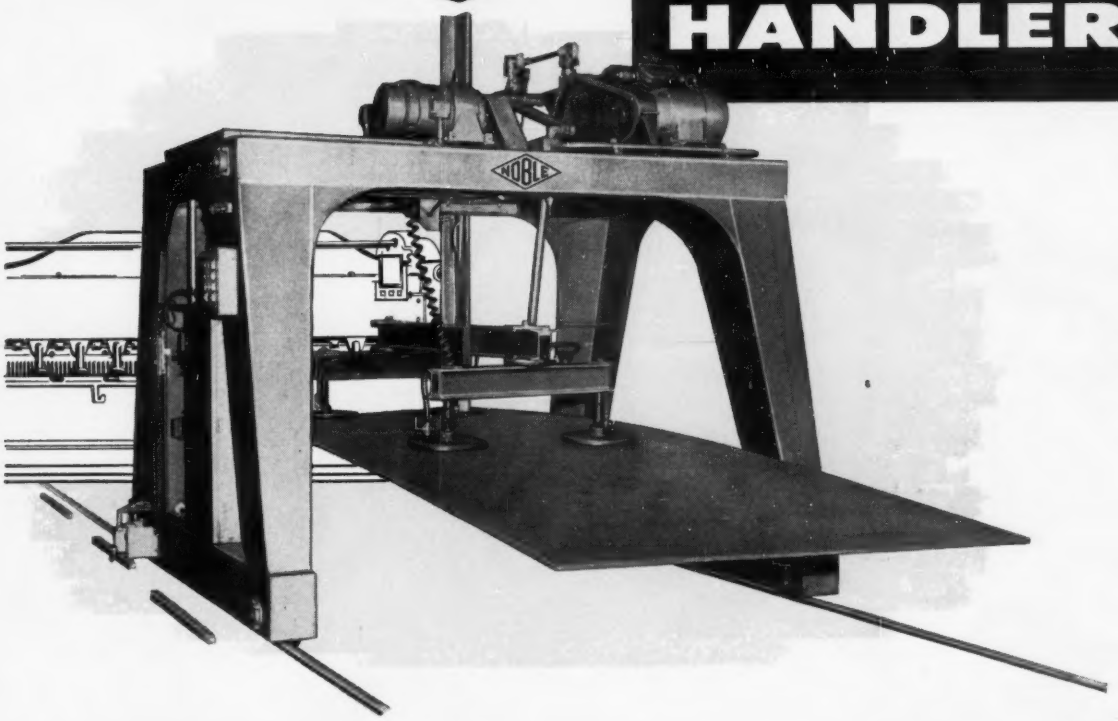
Additional information will be sent on request—please include specifications when writing.

LANDIS 393

THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT - CUTTING - TAPPING - GRINDING - ROLLING

How to Make Your Shear a Production Tool

—ADD A NOBLE *Automatic* PLATE HANDLER



Faster Plate Handling at Lower Cost

The NOBLE Automatic Plate Handler eliminates the 3 slow, costly and often dangerous manual operations sketched at left. The usual 2- or 3-man crew needed to pry up the plate, attach lifting hooks, operate the crane or hoist and move the plate into position is eliminated. At a touch of the control button, your NOBLE Automatic travels to the stack, picks up a plate, raises it to proper height, brings it right to the ball points or casters and puts it into position for shearing, punching, or whatever operation is required. Machine operators and their helpers spend their time on production, not manhandling plate!

LESS IDLE MACHINE TIME...

With a NOBLE Automatic on the job, there's always a plate ready at the machine — no idle standby while operators help wrestle another one off the pile and onto the feed table. You get maximum earning power out of your machine investment.

INCREASED PRODUCTION...

The natural result of reduced idle machine time and faster plate handling. NOBLE Automatic Plate Handler users report a gain of 20% or more, depending on type of application.

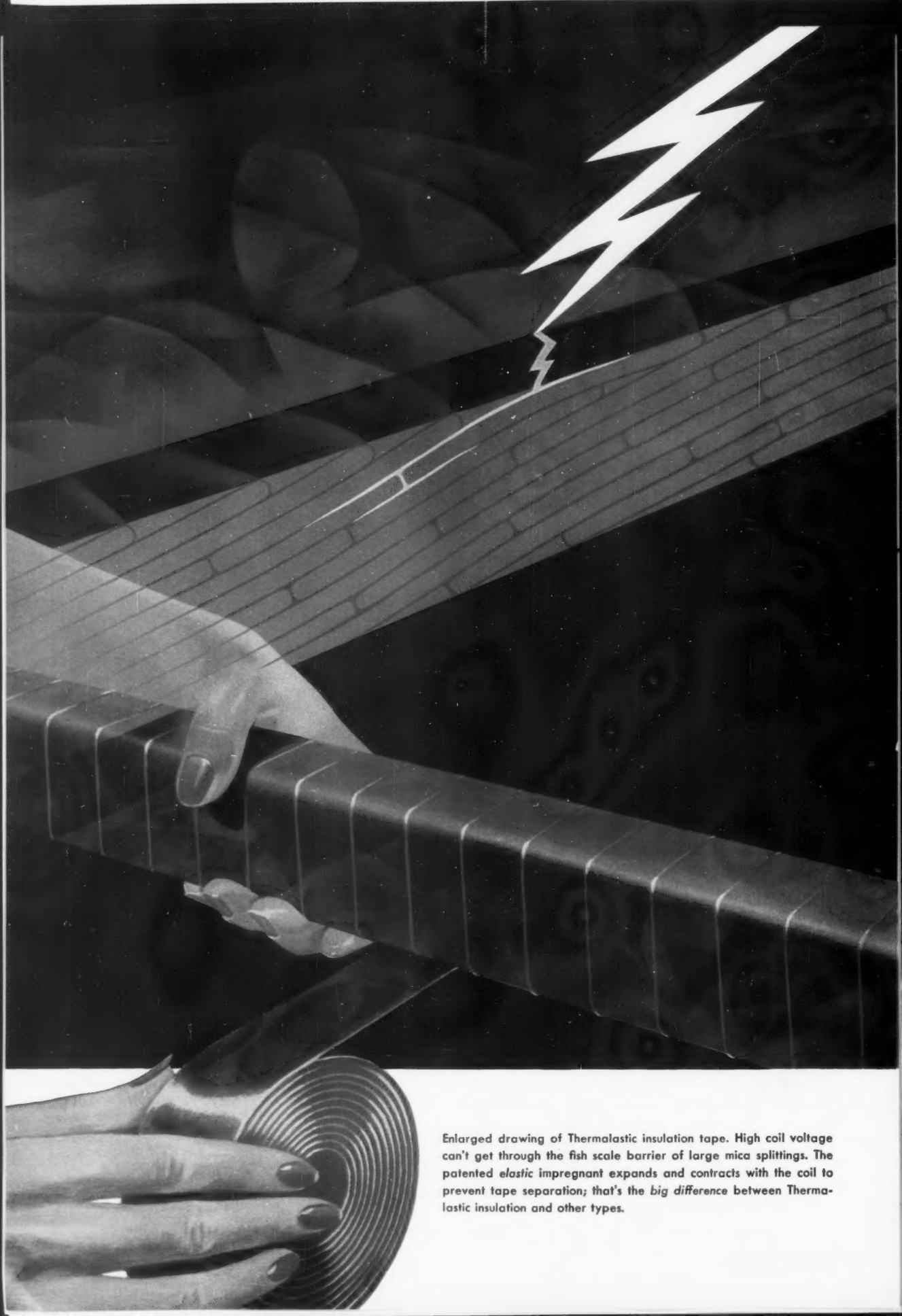
THREE TYPES AVAILABLE...

Standard NOBLE automatic plate handling systems are available in floor-mounted rail, overhead rail and radial transfer types. Standard capacities are 1,000, 2,000, 3,000 and 4,000 lbs.

NEW BROCHURE AVAILABLE... describes economies of automatic plate handling, proper applications, typical system layouts, and all NOBLE equipment involved. Write for your free copy today; please address Dept. S-12.

NOBLE COMPANY

2 **1860 Seventh Street**
Oakland 20, California



Enlarged drawing of Thermalastic insulation tape. High coil voltage can't get through the fish scale barrier of large mica splittings. The patented *elastic* impregnant expands and contracts with the coil to prevent tape separation; that's the *big difference* between Thermalastic insulation and other types.

Here's why Thermalastic insulation ends major cause of generator and motor failure

LARGE mica splittings have long been recognized as the most reliable coil insulation material, but for years it seemed impossible to find the RIGHT impregnant for the insulation tape.

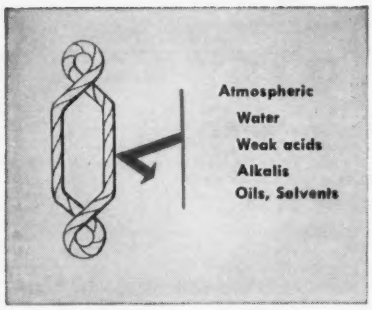
Some were too brittle and others too plastic at high coil temperatures; none could withstand repeated expansion and contraction of the coil . . . and sooner or later, tape separation caused failures.

Then the great discovery — In 1949, Westinghouse research scientists made *Thermalastic*® insulation a reality by discovering the "miracle resins" which cure to a *tough* resilient solid. Large mica splittings, overlapped like fish scales, are locked in this elastic bond which "breathes" . . . expands and contracts with the coil. It doesn't harden or soften with repeated heating by the coil. It doesn't deteriorate with age.

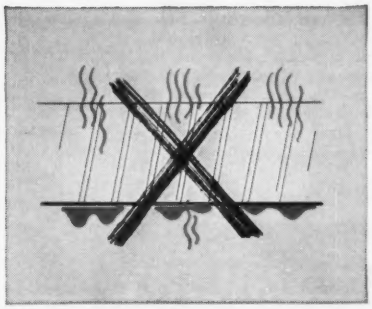
New color movie and bulletin show how and why Thermalastic insulation has extended the life of more than 40 million kva of generators and large motors. Contact your Westinghouse representative or write to Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania. J-15004

YOU CAN BE SURE... IF IT'S

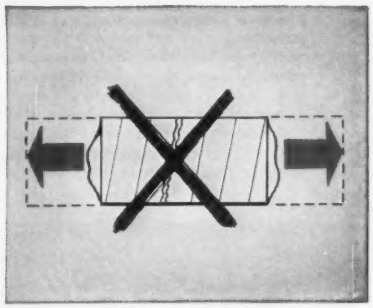
Westinghouse



Withstands attacks
which weaken and finally destroy other insulations. The Thermalastic insulation bond is void-free, has great density, and it's chemically inert. The physical strength of the resilient insulation wall is far greater than that of ordinary insulations.



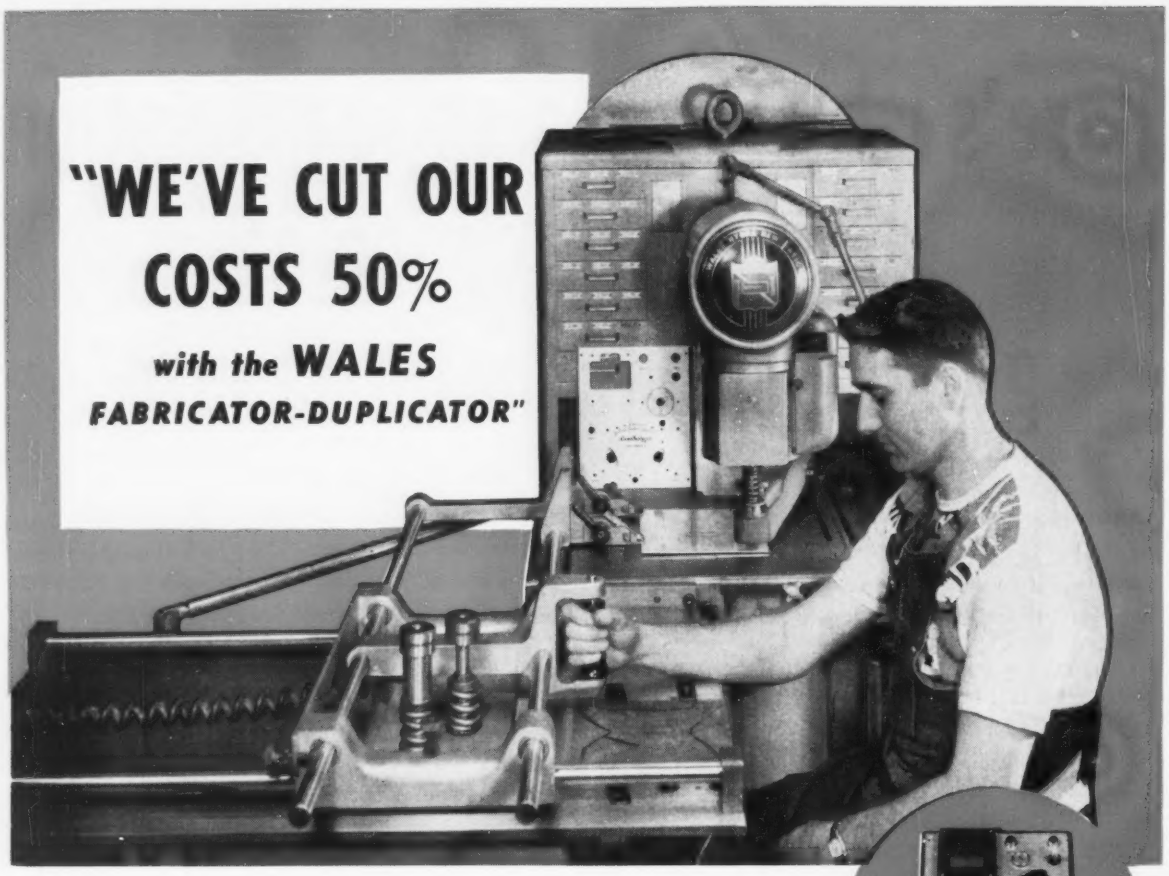
Doesn't soften or embrittle
The patented resins in Thermalastic insulation are thermosetting . . . heat changes them from a liquid to a permanently elastic solid which doesn't soften or embrittle after repeated heating. And it doesn't deteriorate while in storage or in use.



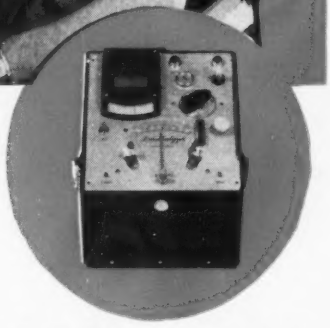
Not stressed
The insulated coil is heated to operating temperature, and *while it's expanded*, the resins cure to an ELASTIC solid. That's why Thermalastic insulation is relaxed when the coil expands, compressed when it contracts. It flexes when the coil is overloaded.

"WE'VE CUT OUR COSTS 50%

with the WALES FABRICATOR-DUPLICATOR"



Mr. Richard H. Aufderheide, President and Production Manager of Rex Metal-Craft Inc., Indianapolis, Indiana reports: "We have been able to cut our costs 50% by using the Wales Fabricator and Duplicator for the manufacture of the Breathalyzer. This punching equipment has proven highly efficient for fast set-up, close tolerance, short to medium production work."



The Breathalyzer is an instrument for determining immediately the degree of alcoholic intoxication. This instrument is used widely by law enforcement agencies and Laboratories.

The WALES Fabricator combined with WALES positive Duplicator is the modern, low cost answer to hole punching. You get holes with sharp definition, clean walls and minimum bell mouth. This equipment is perfect for short to medium runs, from one piece to thousands. Change dies for hole sizes in seconds with a range up to 3½" dia. Accuracy is automatic and positive. Make your own templates, too, on the Fabricator. Eliminate layout, drilling machines or jig-borers. The WALES Fabricator-Duplicator is a complete punching shop in itself.

WALES Strippit COMPANY

A UNIT OF HOUDAILLE INDUSTRIES, INC.

AKRON, NEW YORK

WALES-STRIPPIT OF CALIF., SOUTH GATE, CALIF.
WALES-STRIPPIT OF CANADA LTD., HAMILTON, ONT.

"...the Wales-Way is the PLUS-PROFIT way"

SEND FOR BULLETIN No. 25L

Time studies, specifications, illustrations etc., are all yours for the asking.

WALES MOBILE FIELD UNITS

We'll bring the Fabricator Duplicator right to your door for a demonstration. *Ask for details.*

CALENDAR
OF MEETINGS

Dec. 1-6, American Society of Mechanical Engineers: Annual meeting, Hotel Statler, New York. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Dec. 2-6, Exposition of Chemical Industries: Coliseum, New York. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y. President: E. K. Stevens.

Dec. 4-6, American Institute of Mining, Metallurgical & Petroleum Engineers: Electric furnace steel conference, William Penn Hotel, Pittsburgh. Institute's address: 29 W. 39th St., New York 18, N. Y. Secretary: E. O. Kirkendall.

Dec. 4-6, Building Research Institute: Conference on adhesives and sealants in building, Shoreham Hotel, Washington. Institute's address: 2101 Constitution Ave., Washington 25, D. C. Executive director: William H. Scheick.

Dec. 5-7, National Association of Manufacturers: Congress of American Industry, Waldorf-Astoria Hotel, New York. Association's address: 14 W. 49th St., New York 20, N. Y. Managing director: Kenneth R. Miller.

Dec. 10-11, Society of the Plastics Industry Inc.: Conference on vinyl products in the consumer field, Hotel Commodore, New York. Society's address: 250 Park Ave., New York 17, N. Y. Executive vice president: William T. Cruse.

Dec. 11-12, National Construction Industries Conference: Hotel Sherman, Chicago. Sponsor: Armour Research Foundation, 10 W. 35th St., Chicago 16, Ill.

1958

Jan. 6-8, Southern Industrial Distributors' Association: Midyear meeting, Roosevelt Hotel, New Orleans. Association's address: 1626 Fulton National Bank Bldg., Atlanta 3, Ga. Secretary: E. L. Pugh.

Jan. 13-17, Society of Automotive Engineers Inc.: Annual meeting, Sheraton-Cadillac and Statler Hotels, Detroit. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Jan. 16-17, National Industrial Conference Board Inc.: General session for all associates, Hotel Commodore, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Jan. 17, Malleable Founders' Society: Semiannual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

Jan. 19-22, Institute of Scrap Iron & Steel Inc.: Annual meeting, Eden Roc, Fontainebleau, and Deauville hotels, Miami Beach, Fla. Institute's address: 1729 H St. N. W., Washington 6, D. C. Executive vice president: Edwin C. Barringer.

Jan. 20-22, Truck Trailer Manufacturers Association: Annual meeting, Palm Beach Biltmore Hotel, Palm Beach, Fla. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Huise.

Jan. 20-23, American Road Builders Association: Annual meeting, Sheraton-Park Hotel, Washington. Association's address: 600 World Center Bldg., Washington 6, D. C. Executive vice president: Louis W. Prentiss.

Jan. 20-24, American Institute of Electrical Engineers: Winter meeting, Hotel Statler, New York. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: E. O. Kirkendall.

Jan. 21-22, Steel Shipping Containers Institute Inc.: Winter meeting, St. Regis Hotel, New York. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

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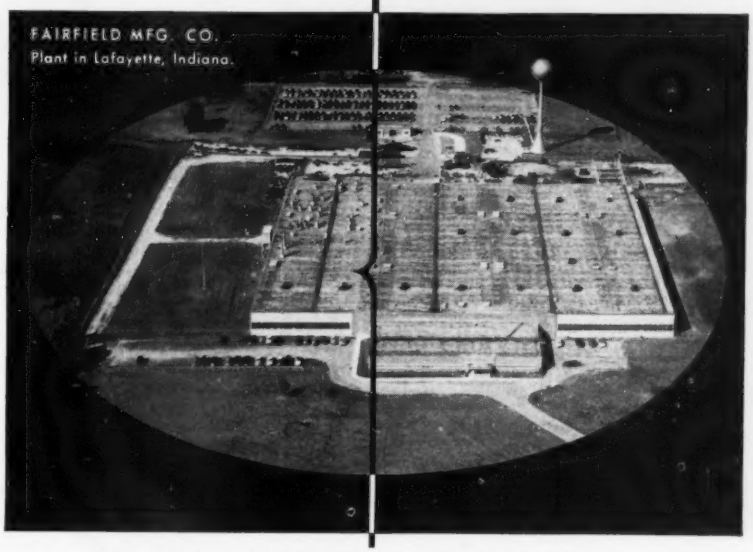

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These eight outstanding strippers are "stock" items in the Enthone line of chemicals for the metal finishing and electroplating industries. In most cases, one of the "Enstrips" will prove to be the answer to your problem. On the other hand, special developments are available from Enthone to meet requirements not covered by the Enstrips featured above. Write us, outlining your needs, and include a sample of your product, if possible. We'll be glad to recommend the best stripping method possible.

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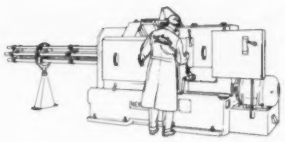
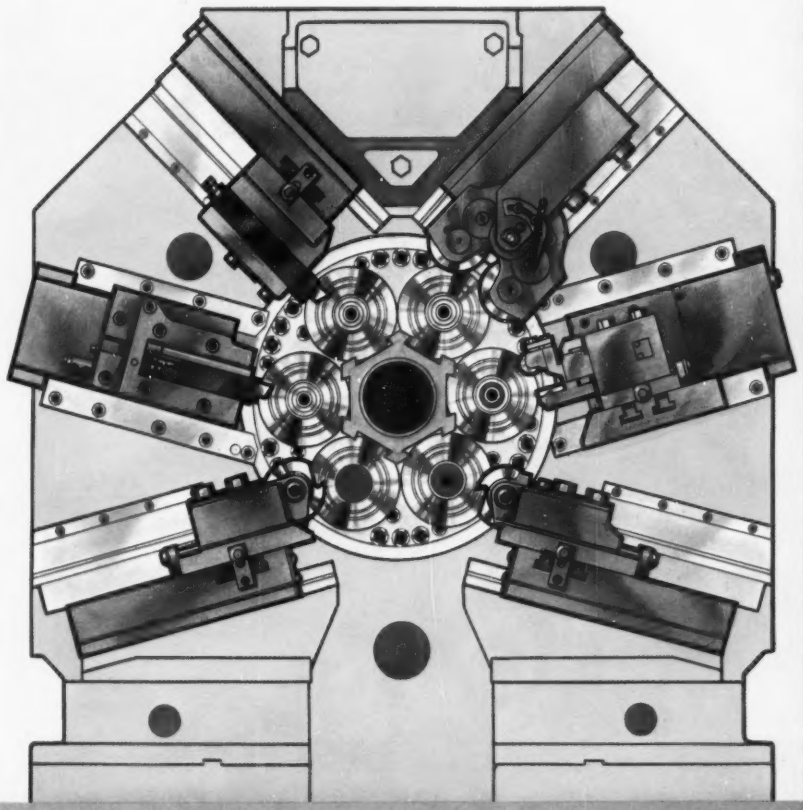
Look at New Britain's

new cross slide arrangement

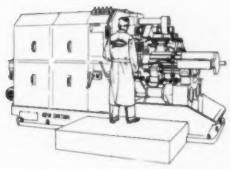


Independent radial cross slides in *all* positions, providing maximum clearance for more cross slide operations.

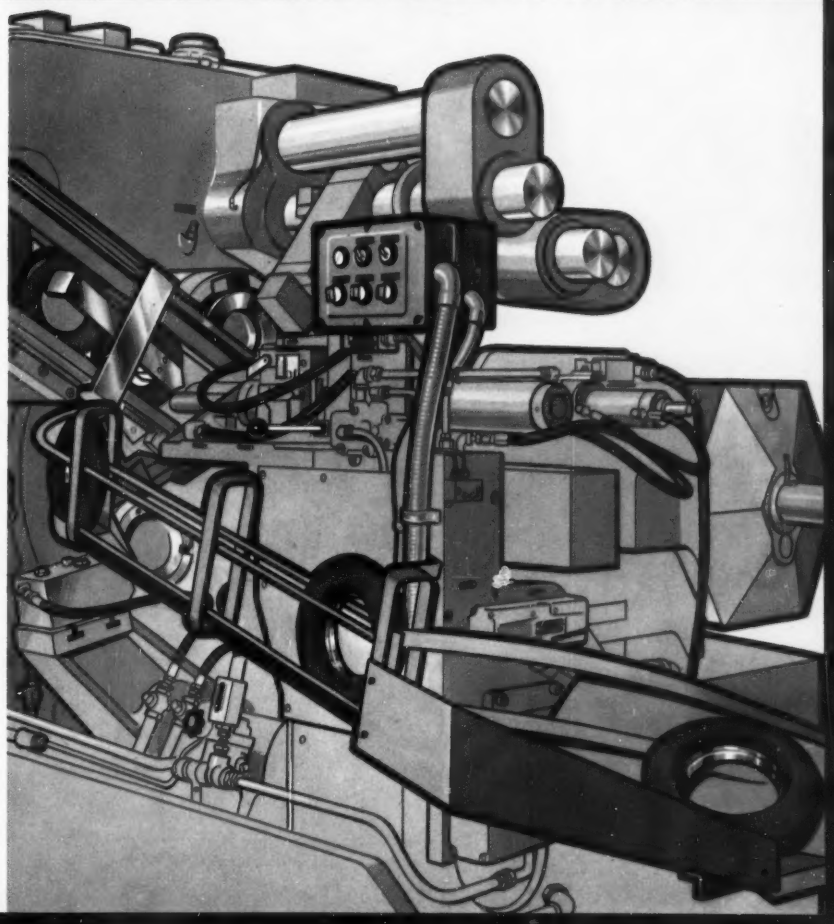


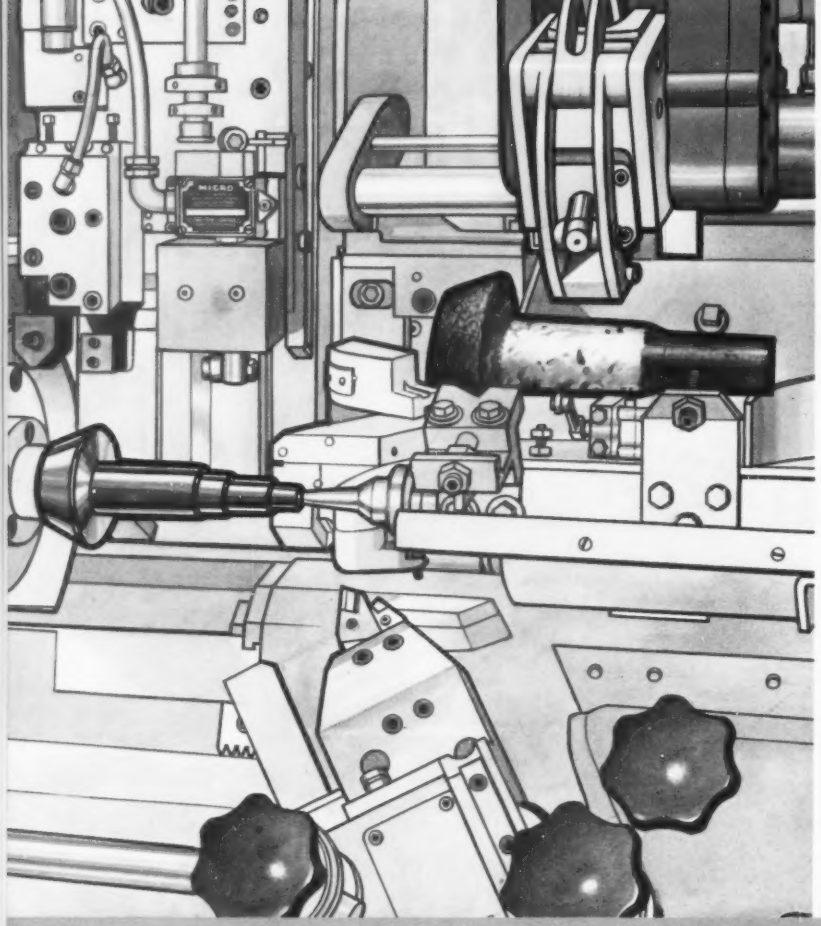
Look at New Britain's

open-end chucker design

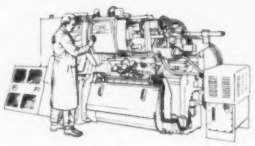


Greater accessibility for all applications and particularly well adapted to automatic handling of pieces. New Britain-Gridley Machine Division, The New Britain Machine Company, New Britain, Connecticut.

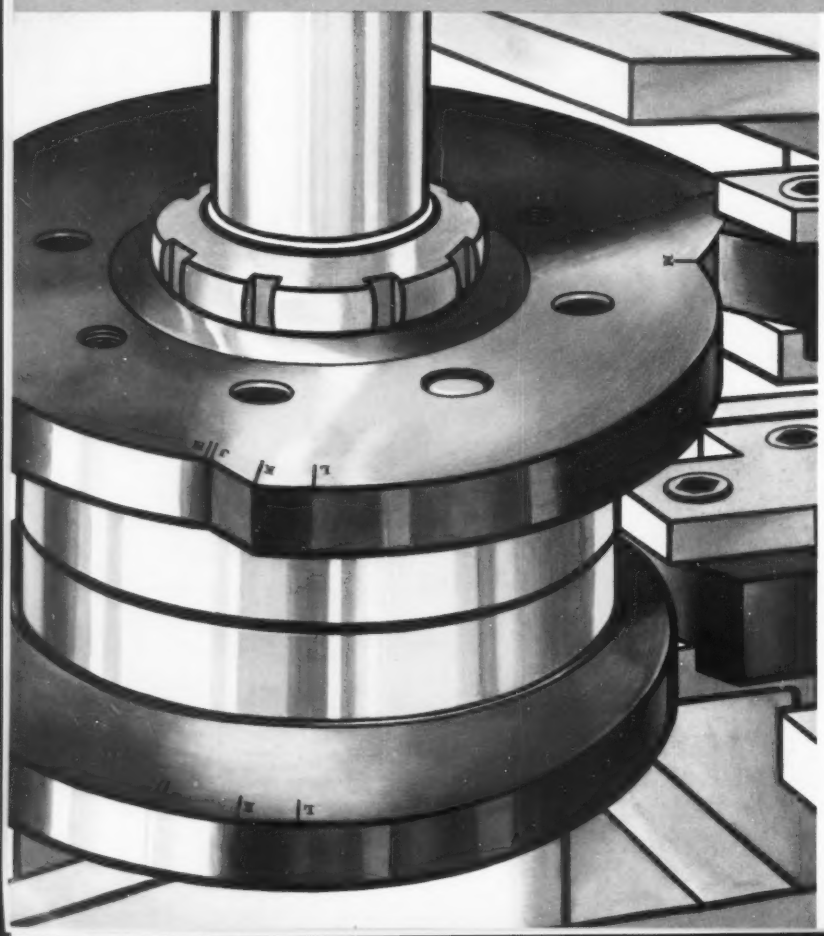




Look at
Automatic Loading on
New Britain +GF+

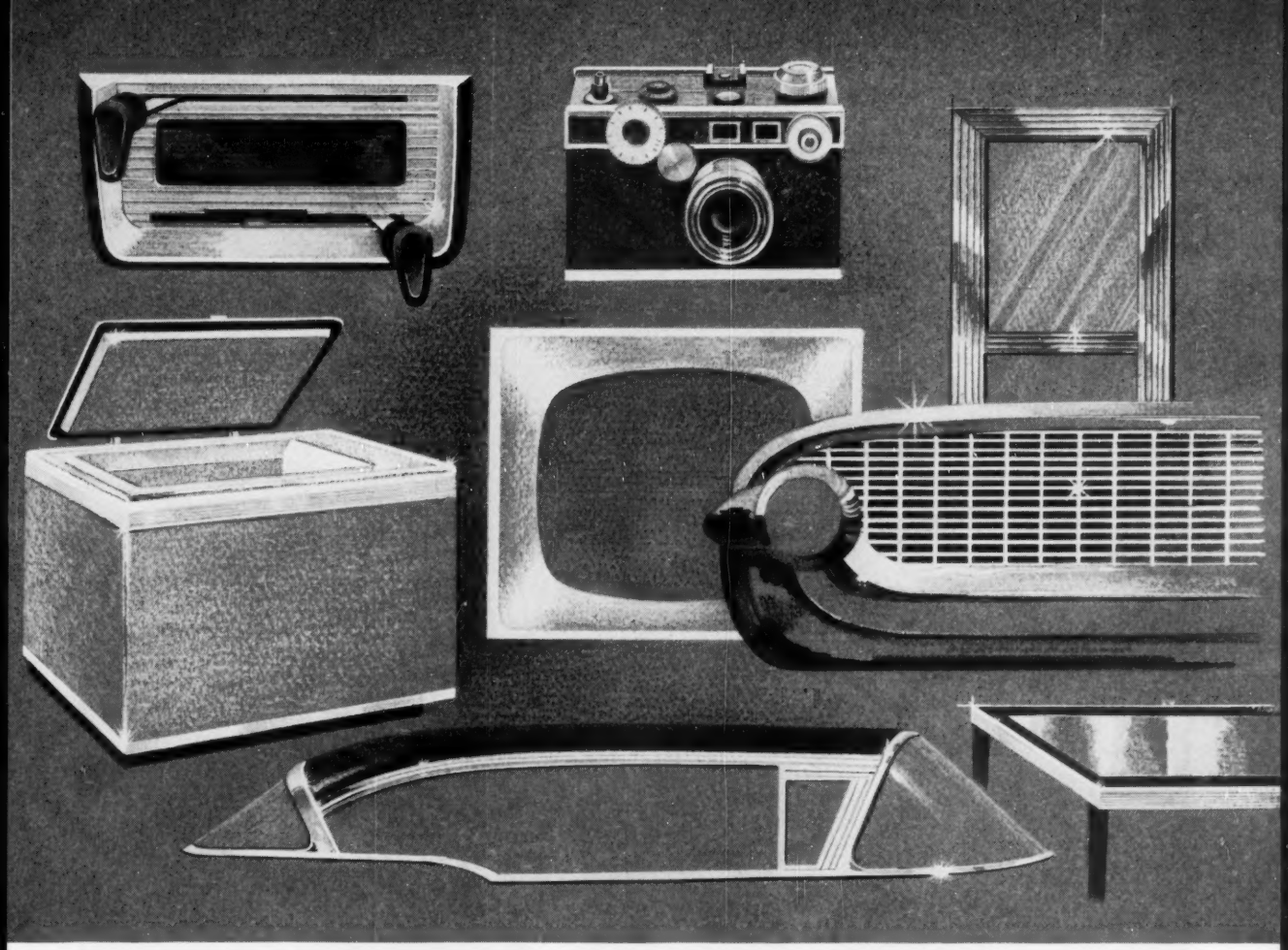


This basic optional feature can make money for you whether you are working with forgings, bar slugs, or bar stock.



Look at New Britain's
cam-controlled boring machine

When you are working to tenths there is no substitute for the positive tool control that only precision cams provide. New Britain-Gridley Machine Division, The New Britain Machine Company, New Britain, Connecticut.



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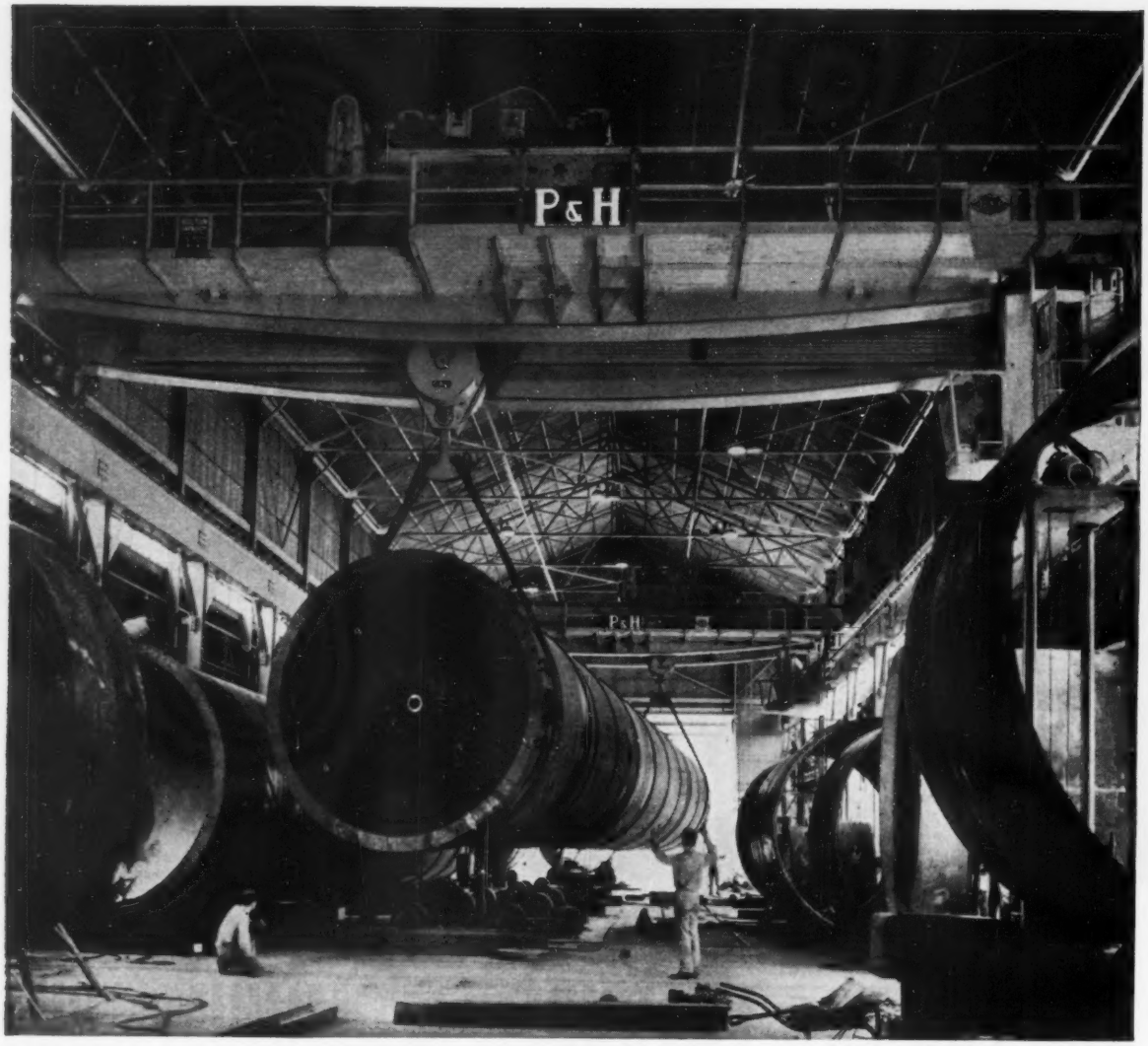

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Precise spotting of giant loads is far easier if you're using P&H Overhead Cranes equipped with P&H electronic "stepless" control.

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A Safe Lift

Even though you don't operate a ski lift, false economy can be costly in your rope purchases, too. For a rope failure can cause personal injury . . . wreck your equipment . . . throw off your entire work schedule . . . and affect employee morale. Yes, a "bargain" wire rope may save you money, yet cost you your peace of mind. Don't take a chance. Buy a rope that's a quality rope—buy Wickwire Rope.

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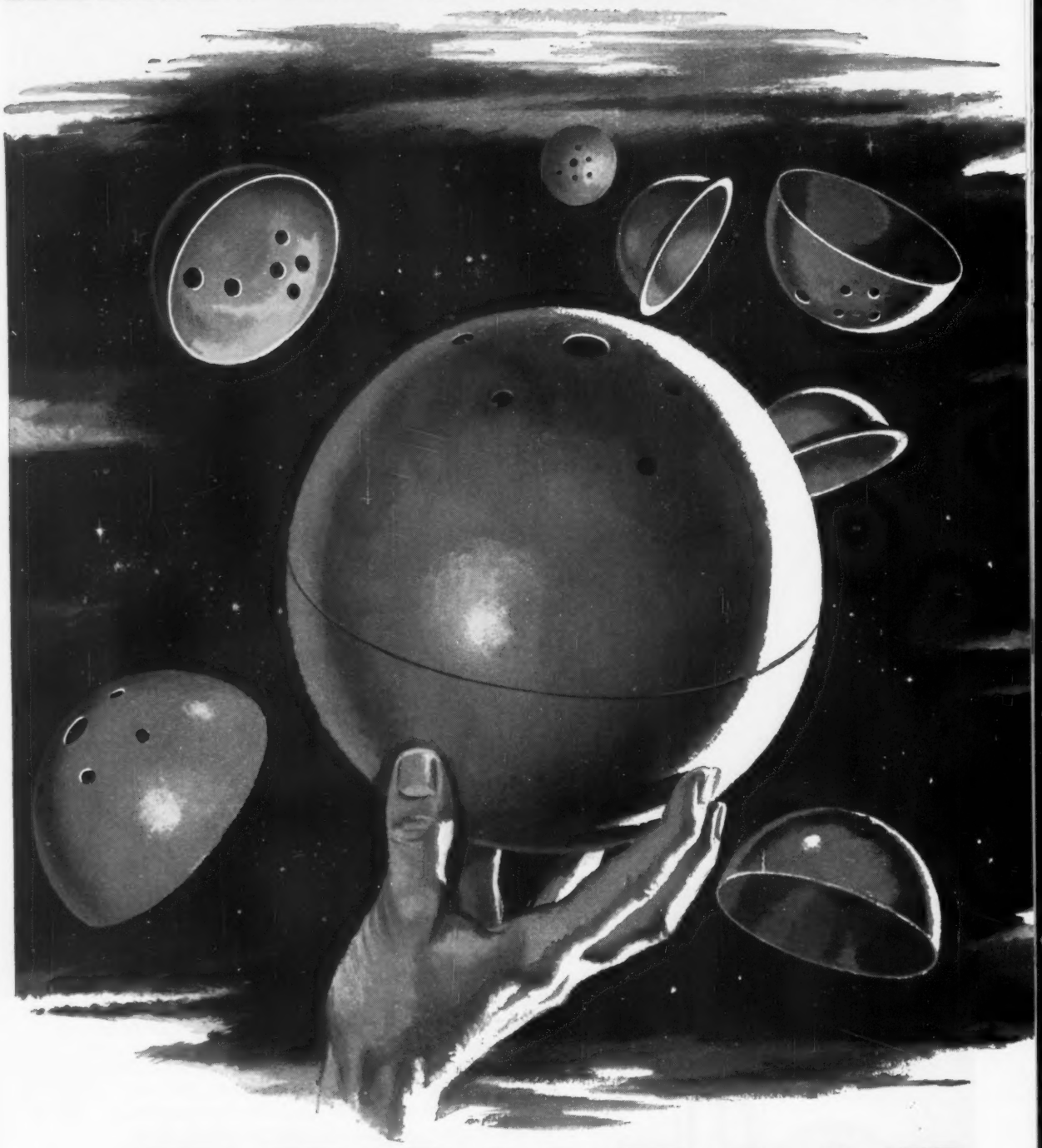
HEMISPHERES FABRICATED



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FROM REPUBLIC TITANIUM

Are Strong, Lightweight, Defy Corrosion at Temperatures Below –150° C.

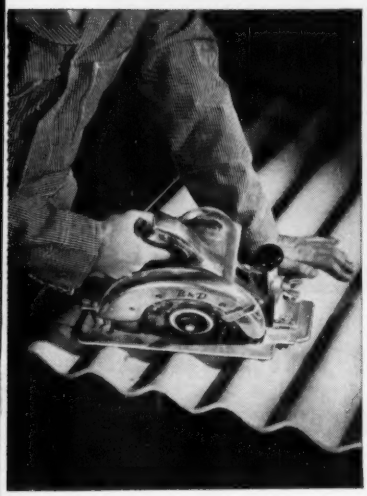
The hemispheres are used in highly specialized aeronautical applications calling for high strength, light weight, and resistance to the severe corrosive action of liquified gases at super sub-zero temperatures.

To meet these requirements, Alloy Products Corporation, Waukesha, Wisconsin, utilizes three major advantages of Republic Titanium in fabricating the parts. (1) Titanium's lightweight advantage reduces weight without sacrifice of strength or safety. In fact, titanium offers the highest strength-to-weight ratio of construction metals. (2) This exceptional high-strength feature of titanium withstands burst pressures in excess of 2,000 lbs. p.s.i. (3) Titanium's extremely high corrosion-resistant properties defy the corrosive action to which the units are constantly exposed.

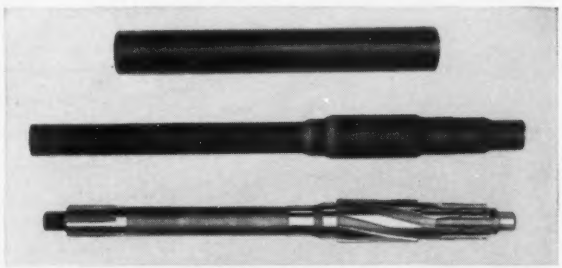
Alloy Products draws circular blanks of commercially pure Republic Titanium, Type RS-70, into hemispheres. The edges are trimmed and holes pierced for instrument and component part connections. Then an extruding operation is performed on the pierced holes. Finally, the hemispheres are welded together into one tough, strong, corrosion-resistant sphere.

The entire fabricating operation is performed without difficulty and with little change in procedure as compared to other materials of construction.

Does this application of Republic Titanium suggest an idea for your product that needs to be strong, lightweight and corrosion-resistant? Republic Metallurgists are ready to help you apply titanium's advantages now. There's no obligation. Mail the coupon today for more information.



STRONG, LONG-LASTING DRIVE GEARS made from Republic Cold Finished Alloy Steel meet heavy-duty service requirements in this Black & Decker portable electric saw. These fine steels offer superior toughness and strength to withstand shock, stress, and fatigue. An exceptionally high strength-to-weight ratio permits design of thinner sections to save weight and hold down size without sacrifice of needed strength. The added advantage of cold drawing provides a bright, smooth finish, accurate size, cross-section, and straightness, plus superior ultimate strength, yield point, hardness and machinability. Our metallurgists and machining specialists will help you apply these fine steels to your product efficiently and economically. Write.



NEW FABRICATING PROCESS Republic Die-Form, can save you 1 out of 3 tons of steel. The automotive transmission shaft, shown above, proves this point. Using Die-Form, 200 tons of cold finished blanks produced parts formerly requiring 300 tons. Die-Form is a new method of cold forming hot rolled carbon, alloy or stainless steel bars into multi-diameter bars ready for final finishing. It permits major savings in time, material, and money in mass produced, multi-diameter machine shafts. Since Die-Form closely approximates the final part, only finishing cuts and/or grinding are required for completion. Scrap loss is minimized—production rate increased. Republic Booklet ADV-746 describes the capacities and limitations of this amazing new process. Send coupon for your copy.

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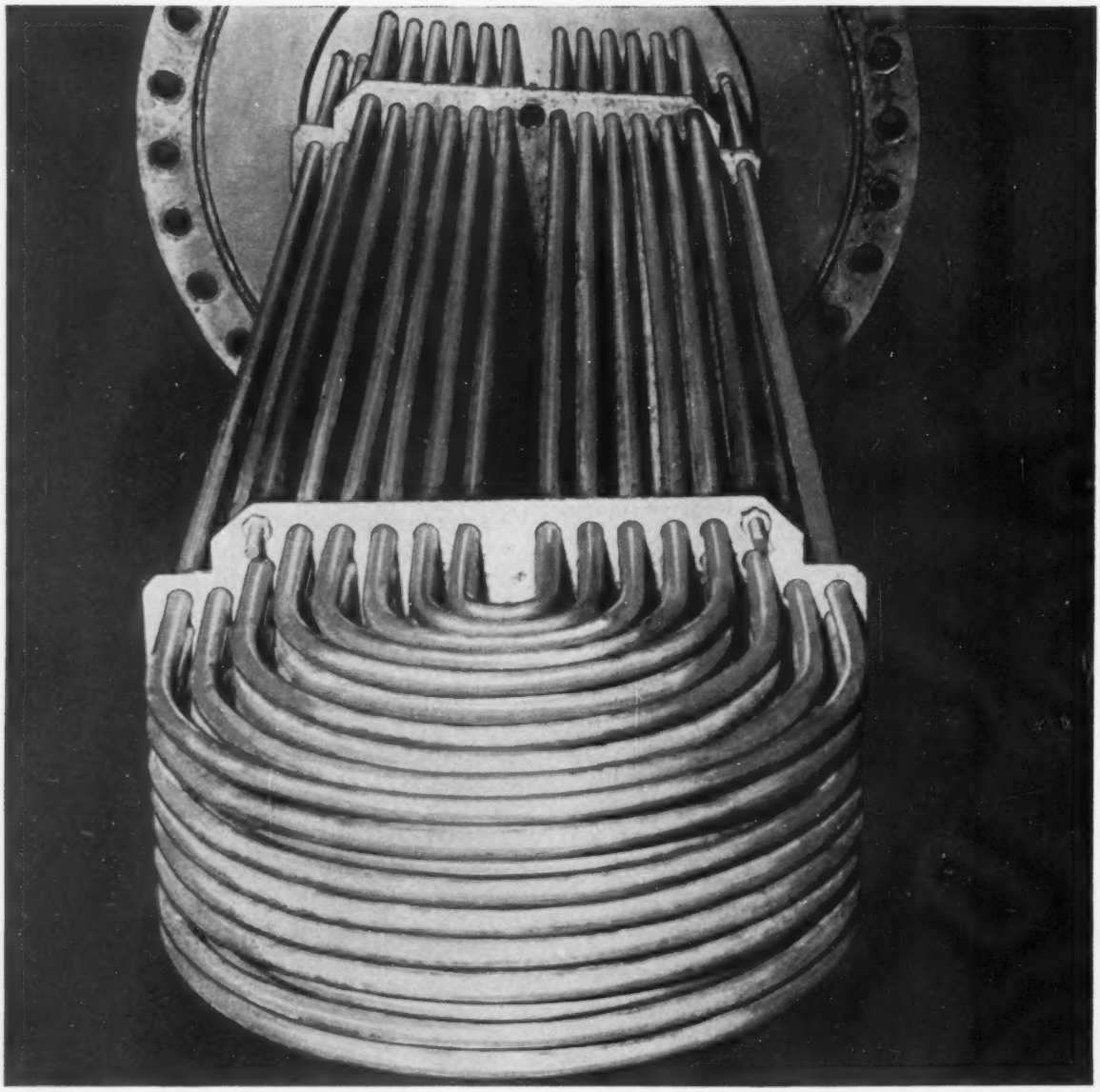

Carpenter Stainless No. 20Cb Tubing withstands Tortuous Fabrication and Service

Note the tortuous hairpin bends in this tube bundle used in a large oil refinery to handle concentrated H_2SO_4 at temperatures from 175-194°F, and pressures from 300-400 psi. Whenever and wherever *you* design or use equipment that handles severe corrodents, check the service-proved cost-saving results you can expect with Carpenter Stainless No. 20 and No. 20Cb. Ask your Carpenter Distributor about these super stainless alloys available in tubing, pipe, sheet, plate, bars, wire, strip and billets.

MEMBER

The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

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Carpenter

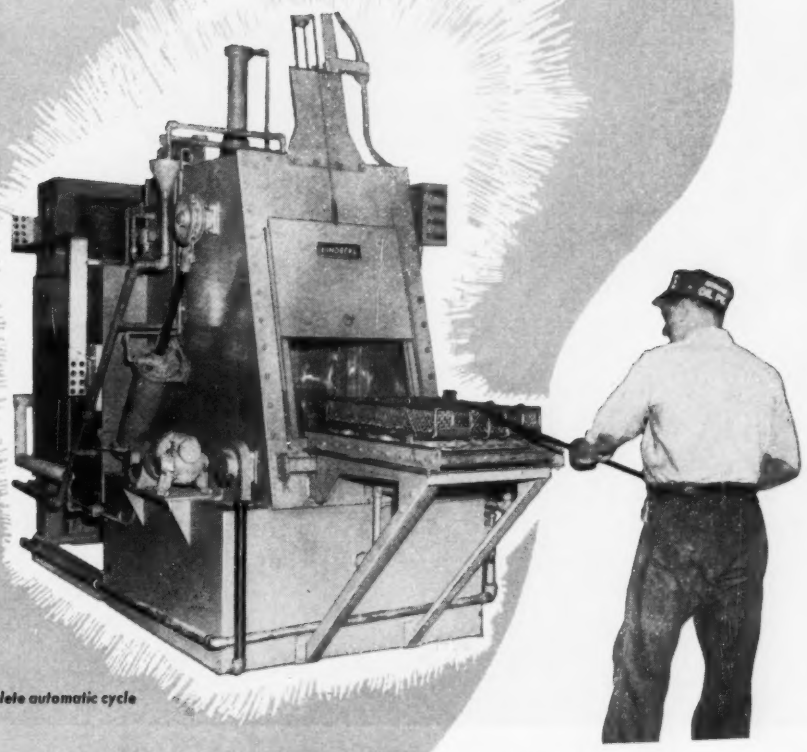
more than corrosion resistance

Stainless Tubing & Pipe

Carpenter No. 20 bars, strip, wire and billets are available also from The Carpenter Steel Company, Reading, Pa.

Here's the work-horse

for many a carbonitriding job



This furnace has complete automatic cycle and quench control.

This is the most widely-used carbonitriding furnace of all. Day in and day out production of tons and tons of work has proved this furnace's ability to increase production quality and volume and reduce costs. It is a versatile furnace, too, not only for carbonitriding but for other uses, carburizing, annealing, carbon restoration and many hardening applications.

This type of furnace is available for both manual and automatic operation. It can be equipped either with Lindberg's efficient new vertical radiant tubes for fuel-firing or for electric heating with Lindberg's revolutionary new CORRTHERM element.

Versatile as this furnace is, we don't claim it is the best solution to *every* carbonitriding problem. But, whatever your need may be, talk it over with Lindberg. Our engineers, as they have done in so many instances, will recommend a sound answer—design it, build it, even field-install it if you wish. Just get in touch with the Lindberg plant or the Lindberg Field Representative in your locality. Lindberg Engineering Company, 2441 West Hubbard St., Chicago 12, Illinois. Los Angeles Plant: 11937 S. Regentview Ave., at Downey, California.

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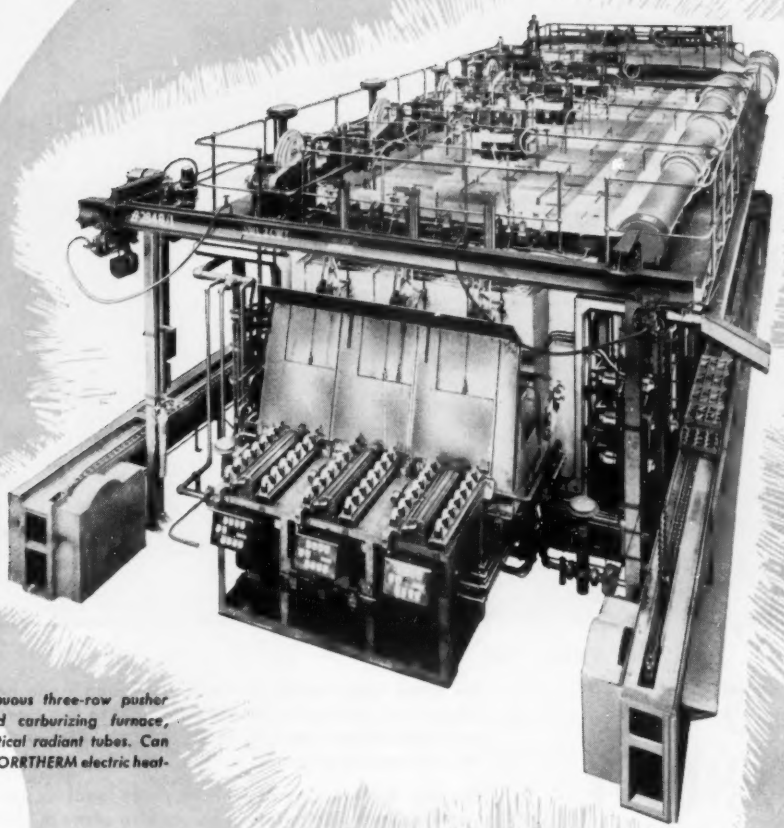
This unitizing idea protects bearing hubs of idlers, safeguards against damage. Loading and unloading are improved by the use of mechanical handling equipment. Caterpillar Parts Departments now unload carloads of idlers in less time than formerly required for manual unloading, and with greater safety. Storage economies are gained, and inventory control simplified.

Acme Idea Man W. C. Saari, works with Caterpillar Tractor Co. on methods for better packaging, handling, shipping.

***Know your Acme Idea Man.** His wide experience in solving all types of product handling and shipping problems will provide Ideas that can be applied profitably to your operations. Call him at the nearest Acme Steel office. Or write Dept. SDU-127, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Ave., Toronto 13, Ontario.

ACME STEEL STEEL STRAPPING

We put the Big Heat on with this one!



A Lindberg continuous three-row pusher carbonitriding and carburizing furnace, gas-fired with vertical radiant tubes. Can also be built with CORRTHERM electric heating elements.

If your carbonitriding or carburizing problem is a big one, better talk it over with Lindberg. The broad experience of our engineering staff in the development of methods and equipment for every heat treating function offers a pretty sure promise of the most practical answer to it. Particularly where field installation is advisable our combination of engineering know-how and sound installation experience is especially valuable to you.

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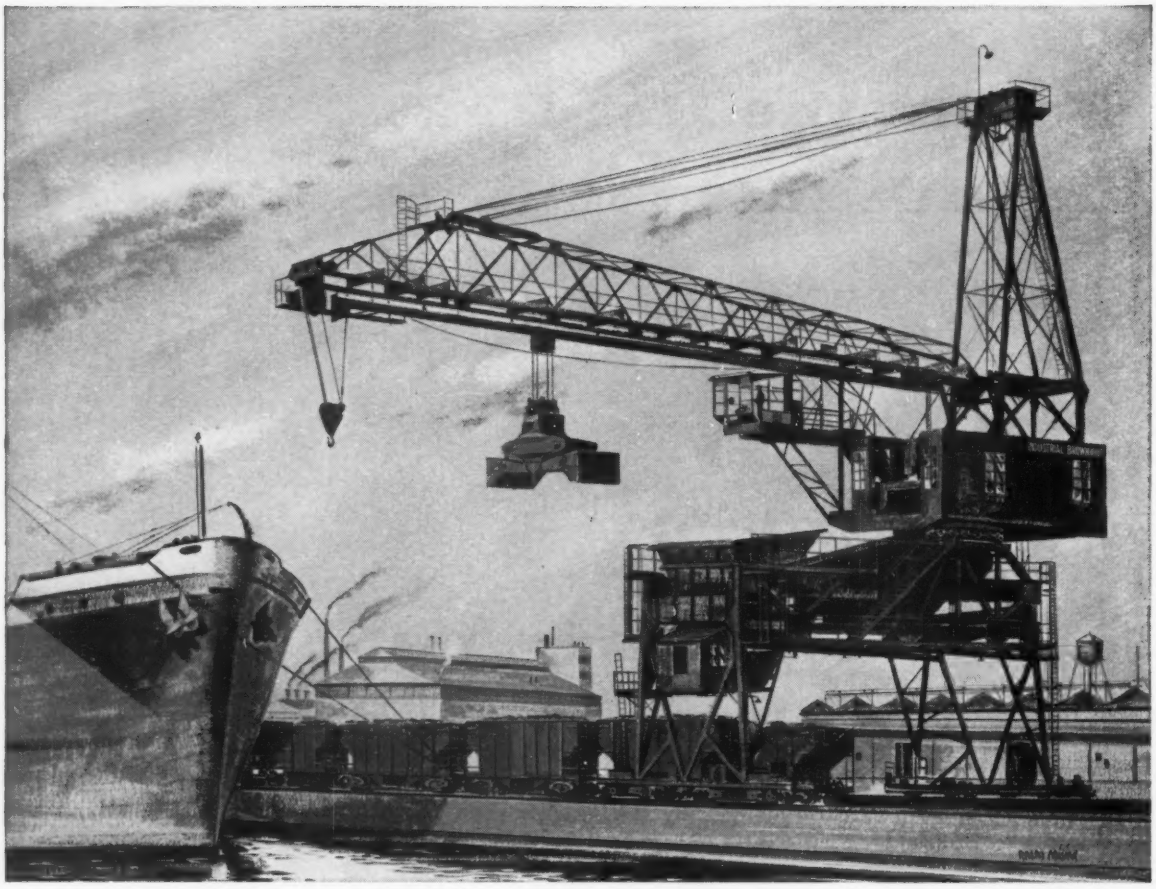
LINDBERG

heat for industry



how 75 ton BROWNHOIST combination crane will greatly increase GALVESTON port facilities

The latest type combination boat-unloading crane being engineered and built by Industrial Brownhoist in Bay City, Michigan will substantially improve facilities in the Port of Galveston's 1957 expansion program.

This big, fast-working Brownhoist crane loads or unloads bulk materials from ship-to-cars or cars-to-ship at the remarkable rate of 540 tons per hour! Equipped with 75 foot boom, on which travel both a hook and a Brownhoist-made, 80 cubic foot flush link-type bucket. The entire unit straddles three railroad car tracks located on the pier.

In addition to boat unloading equipment and material handling bridges, Industrial Brownhoist manufactures Diesel-Electric locomotive cranes from 25 to 90 tons, and railroad cranes up to 250 ton capacities. If your firm can profit from reliable, high-speed, high-capacity material-handling equipment, write for new general Catalog No. 562.

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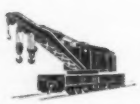

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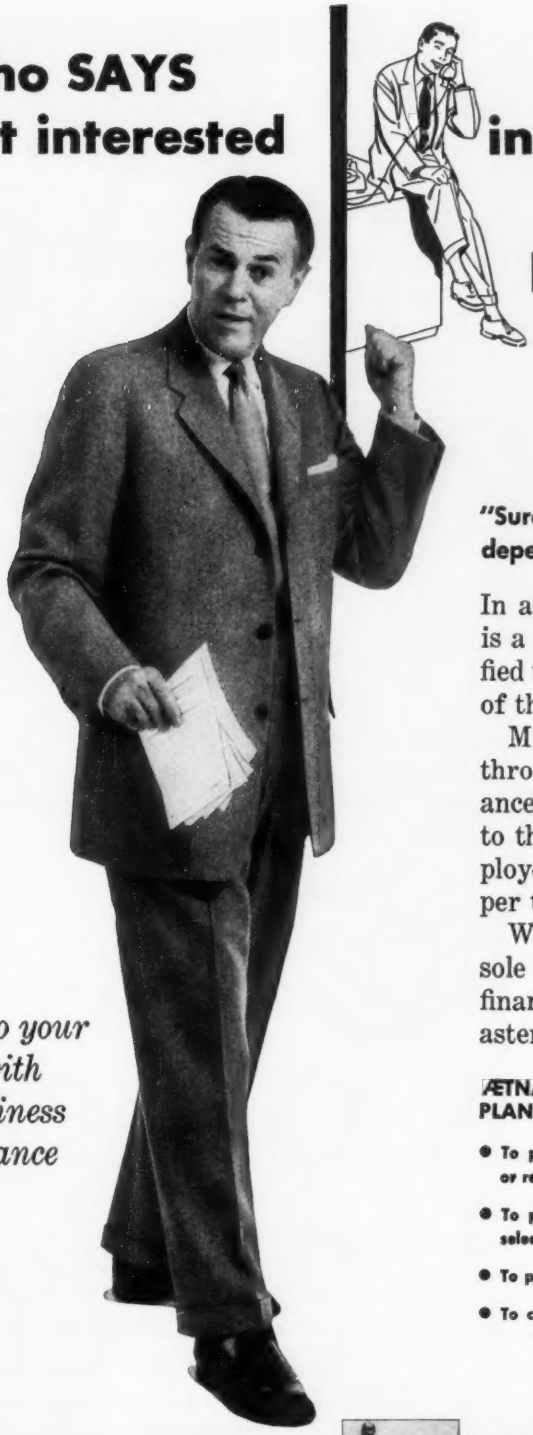

"Sure I am! The growth of this business depends on the people working for me."

In almost any sole proprietorship there is a key person (or persons) best qualified to carry on the business at the death of the owner.

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ÆTNA BUSINESS LIFE INSURANCE PLANS ARE SPECIALLY DESIGNED . . .

- **To protect PARTNERSHIPS against liquidation or reorganization.**
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- **To protect CLOSE CORPORATIONS from forced reorganization.**
- **To cover the loss of a KEY MAN in any organization.**

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In large forgings . . . for transverse and radial ductility.

In deep-drawing steels . . . to prevent aging.

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Jeffrey transmission products are widely known for quality and dependability. Many of the most popular types of chain were originated and patented by Jeffrey and since have been adopted as standard throughout industry. Send for complete data. Distributors in principal cities. The Jeffrey Manufacturing Company, 889 North Fourth Street, Columbus 16, Ohio.

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TUBING IDEAS LIKE THESE

simplify design, increase production, reduce cost!

Ideas for new or improved products are easy and economical to carry out when they call for Van Huffel tubing.

Shown are a few of the ideas Van Huffel has roller die, cold formed to any length from a wide variety of metals: hot or cold rolled steel, stainless steel, high strength steels, aluminum, copper, brass, etc., in gauges from .003 to .312; from forming dies designed and built in our own plant.

In addition, Van Huffel fabricating services: notching, bending, punching, tapering, flanging, beading, etc., can help you make your ideas take shape . . . profitably.

FOR YOUR FILES

24-page Size Brochure on Van Huffel lock seam, butted, welded tubing; angles and channels.

32-page Welded Tubing Handbook containing engineering data in handy reference form.

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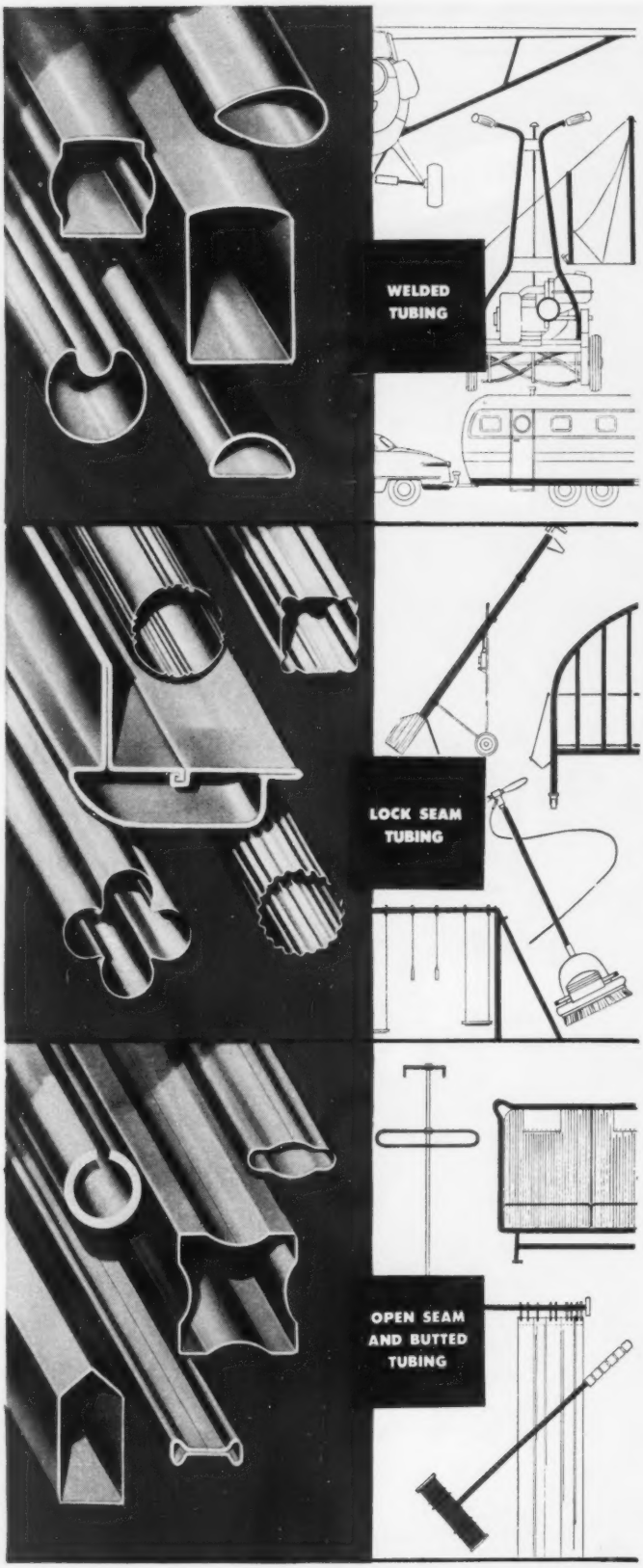
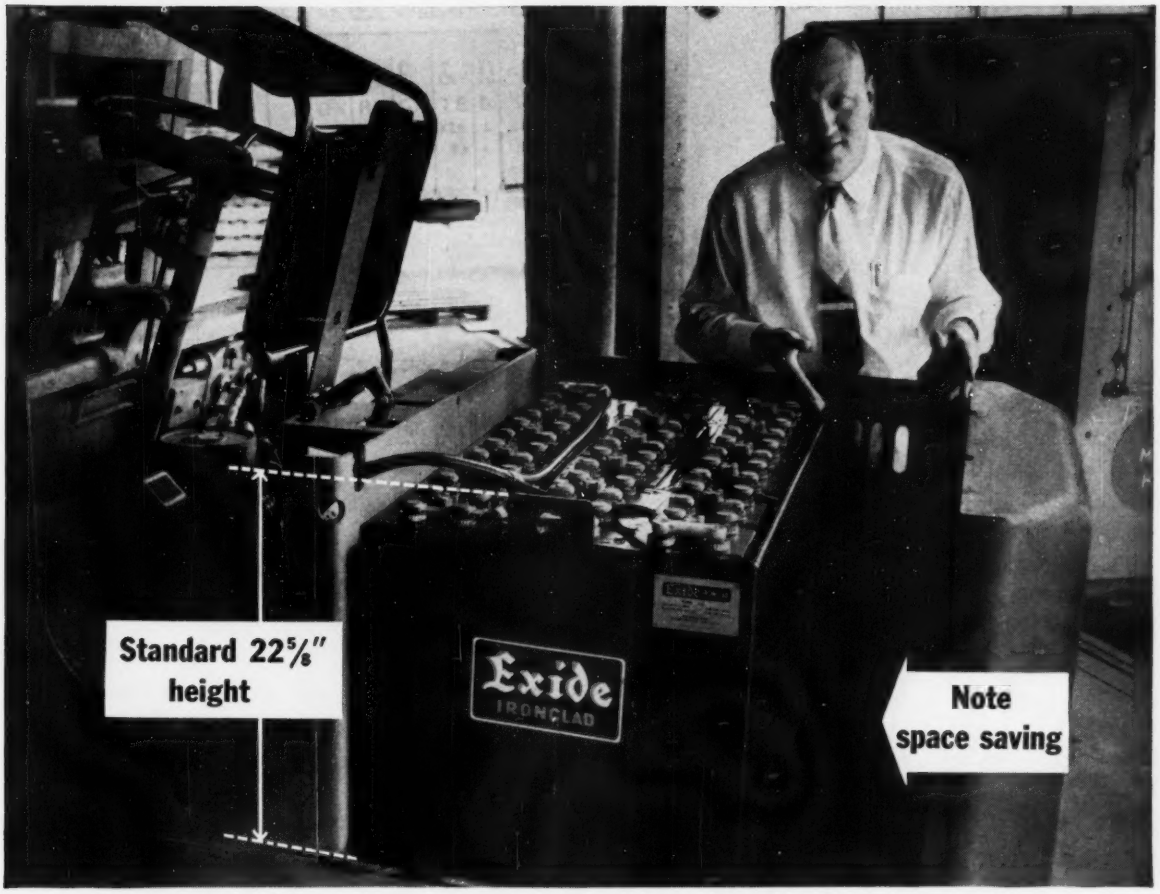
TUBE CORPORATION • WARREN, OHIO



where ideas take shape



Greater flexibility. A 5000 lb. capacity truck with a 648 amp-hr new TG Exide-Ironclad battery. Same truck could hold a 936 amp-hr battery for increased work capacity if needed. Or the 648 amp-hr battery could also be used on a truck as small as 2000 lb. capacity. This flexibility is possible only with Exide's exclusive new TG battery.

NEW TG EXIDE-IRONCLAD BATTERY PACKS SAME POWER IN SMALLER SIZE FOR LOWER COST

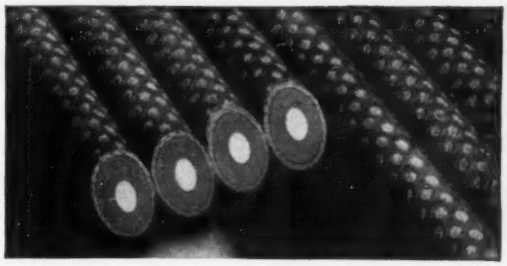
Improved design gives more power and life per dollar. Superior peak-load performance.

Here's the kind of battery economy that really counts: more power and life per dollar. The TG Exide-Ironclad is the most advanced and economical battery ever built for electric industrial trucks.

Every plate packs more power; fewer plates are required to perform a given duty cycle. That means you get a more compact battery with the *standard 22⅝ in. height*. It also means that, for a given capacity, the new TG costs you less. TG's armored porous tubing prevents practically any loss of active material; so even greater economy is gained as a result of its long, dependable service life.

More work from your trucks. The compactness of the TG means you can install more power in your trucks—thus, get more work from them. For a given size truck, TG can give you up to 44% more power than batteries you might otherwise use.

Only Exide offers you so much. When you order new batteries, get all the power, performance and life your dollar can buy. Get TG EXIDE-IRONCLAD. For full particulars about the extra productivity and longer life of the new battery, call your EXIDE Sales Engineer, or write Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

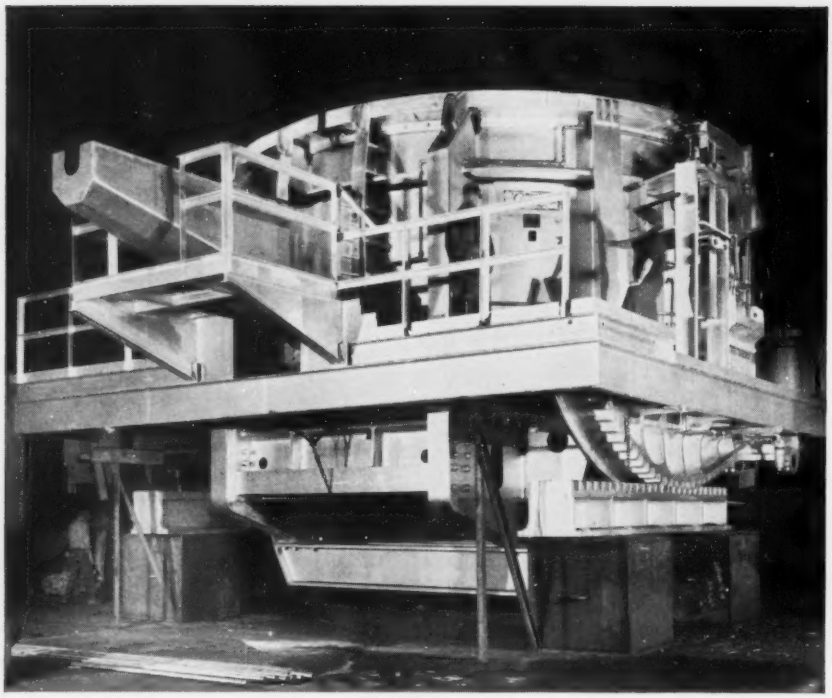


New, more porous armored tubing for positive plate. Eases current flow. Holds more active material. Boosts battery power. Corrosion resistant Silvium* grid insures long plate life.

*Exide's patented grid alloy

Exide®

THE ELECTRIC STORAGE BATTERY COMPANY



"I prefer Lectromelt Furnaces because...

Lectromelt* has offset rocker centers which return the furnace from the extreme tilting position, in case of tilting equipment failure. Added safety!

Rockers and tilting mechanism are out-from-under; won't get clogged by spillage or burn-throughs. Like all Lectromelt components, they're sturdy and strong.

Catalog 9-B describes Lectromelt Furnaces. For a copy, write Lectromelt Furnace Division, McGraw-Edison Company, 323 32nd Street, Pittsburgh 30, Pennsylvania.

Lectromelt*

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NEW GENERAL ELECTRIC DC MOTOR HAS

Coils Encapsulated for Longer Life

KINAMATIC* *. . . a new standard in industrial direct-current motors* . . . designed to give extra dependability to automated production systems.

Encapsulated Field Coils . . . insulated with mica and glass and permanently sealed against moisture and corrosive airborne materials . . . virtually eliminates insulation as an element in motor life and adds a reliability factor never before available in a standard direct-current motor.

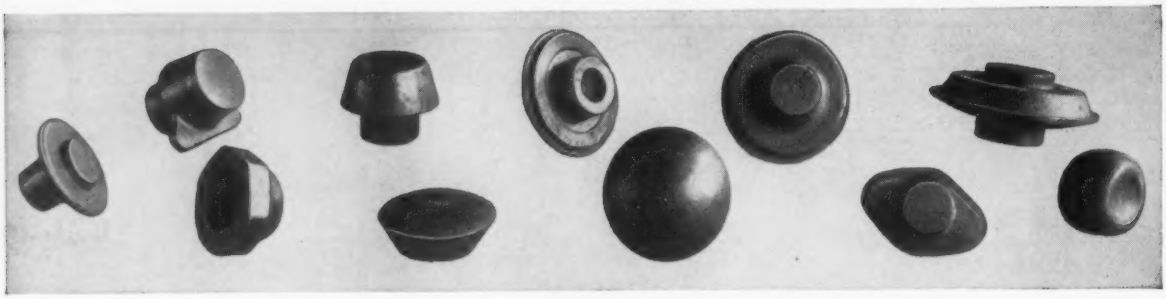
Greater Versatility . . . a 15% service factor now available in the standard, dripproof d-c Kinamatic motor means user can: 1) obtain 15% more than rated power for normal life of motor; 2) obtain 100% longer motor life at rated power; or, 3) obtain greater versatility on speed and horsepower duty cycles.

Additional information is available at your nearest General Electric Apparatus Sales Office. Or, write for Bulletin GEA-6355. *Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania.*

*Trade-Mark of General Electric Company. 813-12

Progress Is Our Most Important Product

GENERAL ELECTRIC

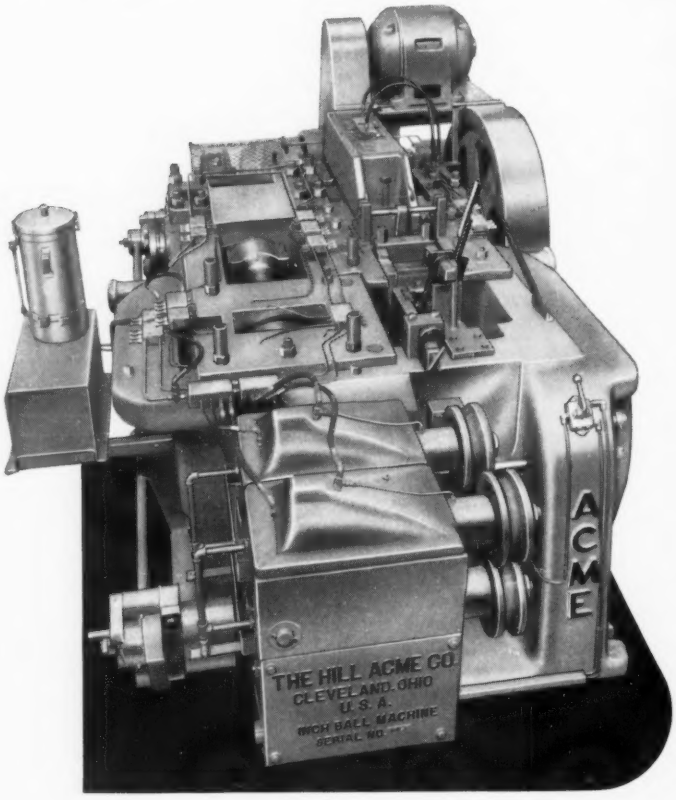


Typical Shapes Produced by ACME Single Blow Forging Machines

SINGLE BLOW FORGINGS
AT 135 PER MINUTE

One man operating this ACME single blow solid die forging machine is producing 135 one inch hard steel balls per minute from 11/16″ stock. Automatic feed rolls carry bar stock at proper speed for maximum efficient operation. Adequate safety devices prevent jamming of the die.

ACME solid die forging machines are rated according to the size ball they will forge. Machines are built from 1″ to 5″ capacity.



Complete information is given in Bulletin SB-57.

The HILL ACME Company

1207 W. 65th STREET • CLEVELAND 2, OHIO

Manufacturers of: "ACME" FORGING • THREADING • TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BAR-BILLET SHEARS
"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • "CLEVELAND" KNIVES • SHEAR BLADES

Glance at the landing gear assembly of a modern aircraft and the chances are good that you'll be looking at Green River Steel. This vital mechanism must be able to withstand the impact of extreme shock loads at high and very low temperatures. That's why Green River is so often specified by name. The splendid new 60-ton arc-type electric furnaces down at Owensboro, Kentucky, are pouring steel to be processed under the exclusive Dornin patents which make MACRO-CLEAN steels of unmatched forging qualities and grain structure.

Even if you aren't in the business of producing critical aircraft parts, if you have reason to buy billets, bars or slabs of aircraft and commercial grade alloy, stainless or forging quality carbon steels, you can't do better than place your order with Green River—the steel industry's new Southern Star.

These Jessop district offices and representatives can now service you with Green River Products

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Montreal, Quebec
New York, N. Y.
Philadelphia, Pa.
Pittsburgh, Pa.
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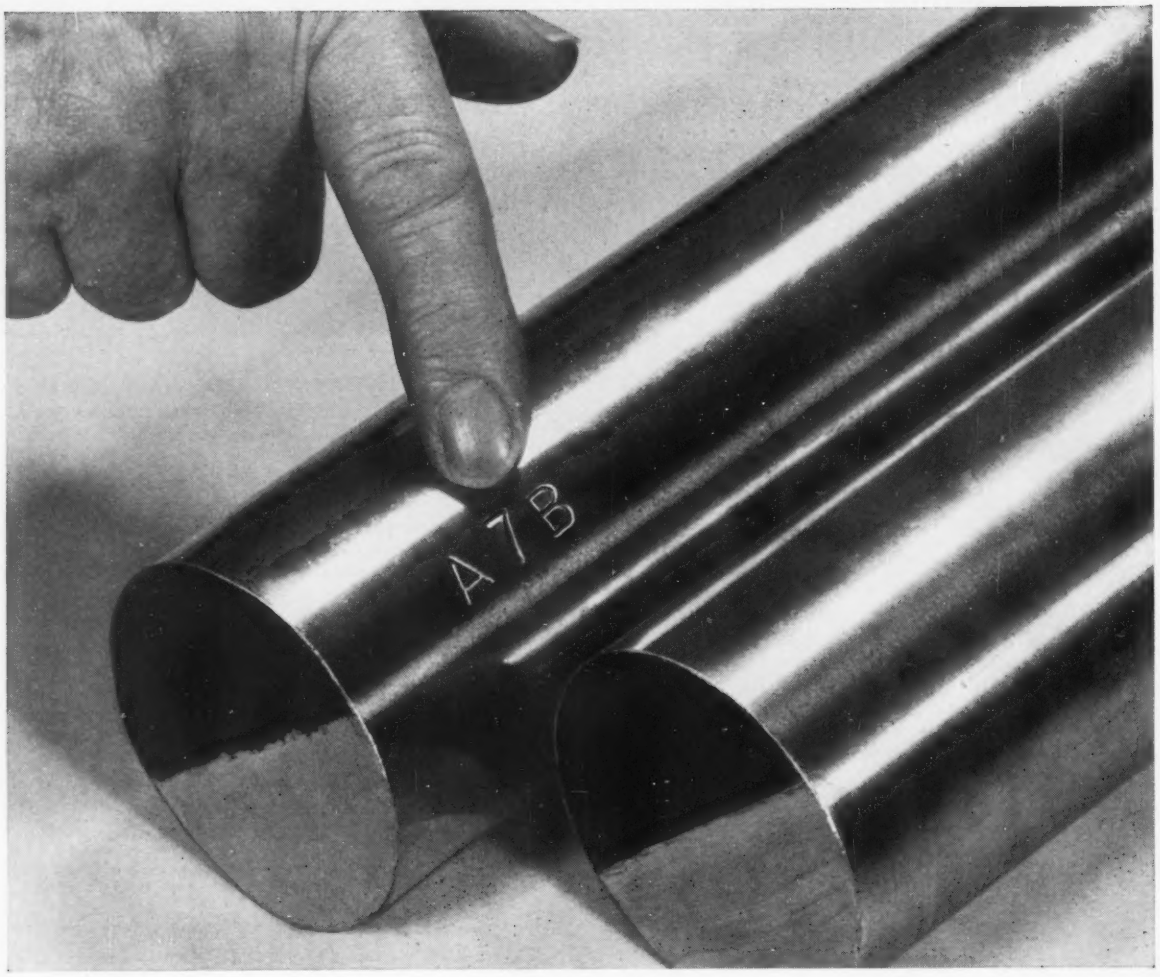
"New Southern Star"

GREEN RIVER STEEL

CORPORATION · OWENSBORO, KENTUCKY

A SUBSIDIARY OF JESSOP STEEL COMPANY



With ONE you know, the other you don't

Two alloy steel bars of the same type can differ markedly in hardenability—if they come from different furnace heats. But with Ryerson 8-step quality control, there's no need to guess. Every Ryerson alloy bar is positively identified by heat number. You get a "heat history" report with every order.

Here's what the Ryerson report tells you:

1. **Heat analysis.** Not just the chemical range for the type of alloy, but the specific analysis of the heat from which your steel was rolled.
2. **Tested Hardenability.** Not just the average hardenability for the alloy, but the actual Ryerson-tested hardenability for the particular heat . . . as quenched and at three draw temperatures.

You can always be *sure* with alloys from Ryerson. On your next order, get the protection offered by the Ryerson Certified Alloy Steel plan. It costs no more. Call your nearby Ryerson plant.

RYERSON STEEL

Principal products: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing—aluminum, industrial plastics, metalworking machinery, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI • CLEVELAND
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Metalworking Outlook

Wave of Small Auto Strikes?

Look for a long series of small, but production-cutting strikes in the auto industry until next June 1. The United Auto Workers doesn't want too many cars in dealers' hands by the time auto contracts expire six months from now because that would dilute the effects of a major strike. A big walkout is likely in June (see Page 53). The assemblies of '58 models have already been hurt by work stoppages at General Motors Corp.'s Detroit Transmission Div. and Chrysler Corp.'s engine plant.

Teamsters Will Leave AFL-CIO

The Teamsters will probably get kicked out of the AFL-CIO this week. The nation's top labor federation holds its annual convention beginning Dec. 5. Its executive board has already recommended dropping the truck drivers. The Teamsters' president-elect, James Hoffa, has been busy trying to persuade local labor councils to swing enough delegates to defeat the ouster, but it doesn't look like he'll succeed.

Score on Russian Science Grads

As of mid-1957, the Russians had about 1.5 million graduates in all scientific disciplines, compared with 1.3 million in the U. S. What's more, about 15,000 Chinese and students from other satellite countries are studying in Russia. The U. S. has some 12,000 foreign students.

Needed: Office Revolution

An office revolution is long overdue in America, says R. C. Sollenberger, executive vice president of the Conveyor Equipment Manufacturers Association. A factory worker today can produce 14 times as much as his ancestor did 100 years ago, but productivity of the office worker has increased only 40 per cent in that time, he says, urging the use of more conveying equipment in the office.

Electronic Exports Dip, Imports Rise

Exports of commercial electronic equipment and parts have declined to $210.5 million during the first eight months of 1957, vs. $223.5 million in the corresponding 1956 period. During the same time, imports of radio and TV equipment and parts rose to $9.4 million, compared with $8.6 million for all of 1956. West Germany, Japan, and Great Britain are the major foreign sources (in that order), says Electronic Industries Association.

Machine Tool Orders Continue Slide

New orders for machine tools continue to slide, and shipments in 1957 may not equal the $886.2 million delivered in 1956. October bookings

dipped to $27.9 million, compared with $28.8 million in September, and $66.1 million in October, 1956. Average industry backlogs are down to 3.4 months. Look for net new orders to total about $525 million in 1957, compared with $924 million last year. The new order pace for 1958? About $500 million, believe some industry people.

Rectifier Sales Soar

Sales of semiconductor rectifiers and rectifier equipment will hit a high of $100 million this year and will pass $200 million in ten years. This year's volume is triple that of seven years ago, says General Electric Co.'s Frederick M. Spaugh. Rectifier components and equipment convert alternating to direct current in products ranging from household appliances to steel mill drives.

The Scrap Situation

About one-fifth of all iron and steel, copper, and aluminum that goes into America's metalworking factories comes out as scrap, reports the Business & Defense Services Administration. The average scrap generation ratio is 19.4 per cent for iron and steel, 20.3 per cent for copper, and 18.4 per cent for aluminum. Nearly two-fifths of the iron and steel industrial scrap reported was generated by the motor vehicle and part industry; over one-fourth of the aluminum by the aircraft industry; and almost one-fourth of the copper by manufacturers of valves, fittings, and plumbing fixtures.

Census on Housing

We had 55.3 million dwelling units in the U. S., as of Dec. 31, 1956, compared with 46.0 million as of Apr. 1, 1950. The Census Bureau says that represents an average annual gain of about 1.4 million units, exceeding the average annual gain of 870,000 units between 1940 and 1950.

Straws in the Wind

Firth Sterling Inc., Pittsburgh, has received a $1.5 million contract to produce 40,000 lb of zirconium alloy mill products a month for one year. They'll be used by Westinghouse Electric Corp. in atomic power applications . . . Universal-Cyclops Steel Corp., Bridgeville, Pa., will acquire Empire Steel Corp., Mansfield, Ohio, and Reeves Steel & Mfg. Co., Dover, Ohio; a wholly owned Universal-Cyclops subsidiary, Empire-Reeves Steel Corp., will be formed to operate the Mansfield and Dover plants . . . Large quantities of high-grade iron ore concentrates will be available in the state of Minas Gerais, Brazil, according to a survey conducted for Brazil by Armour Research Foundation . . . GM's hourly employees won't get a cost-of-living boost in the next three months because the consumer price index hasn't gone up sufficiently . . . The U. S. auto industry will produce about 6.2 million cars in '57—1.5 million in the fourth quarter, compared with 1.3 million in the third, 1.6 million in the second, 1.8 million in the first . . . U. S. Steel Corp. hopes to build 12 big lake ore carriers.

Operates MARVEL No. 8 Band Saw by FEEL!

sightless operator uses saw to FULL CAPACITY!

Among the many advantages of the MARVEL No. 8 Band Saw is the simplicity and convenience of operation built into this universal metal cutting saw.

Here's a case in point. Paul Stevens, who is totally blind, is employed by the Purkett Manufacturing Co., Joplin, Mo., manufacturers of laundry equipment, as a MARVEL No. 8 Band Saw operator. He operates two MARVEL No. 8 Band Saws, filling orders from the fabricating department for bars, shapes and even mitres. He handles the entire operation without assistance from anyone.

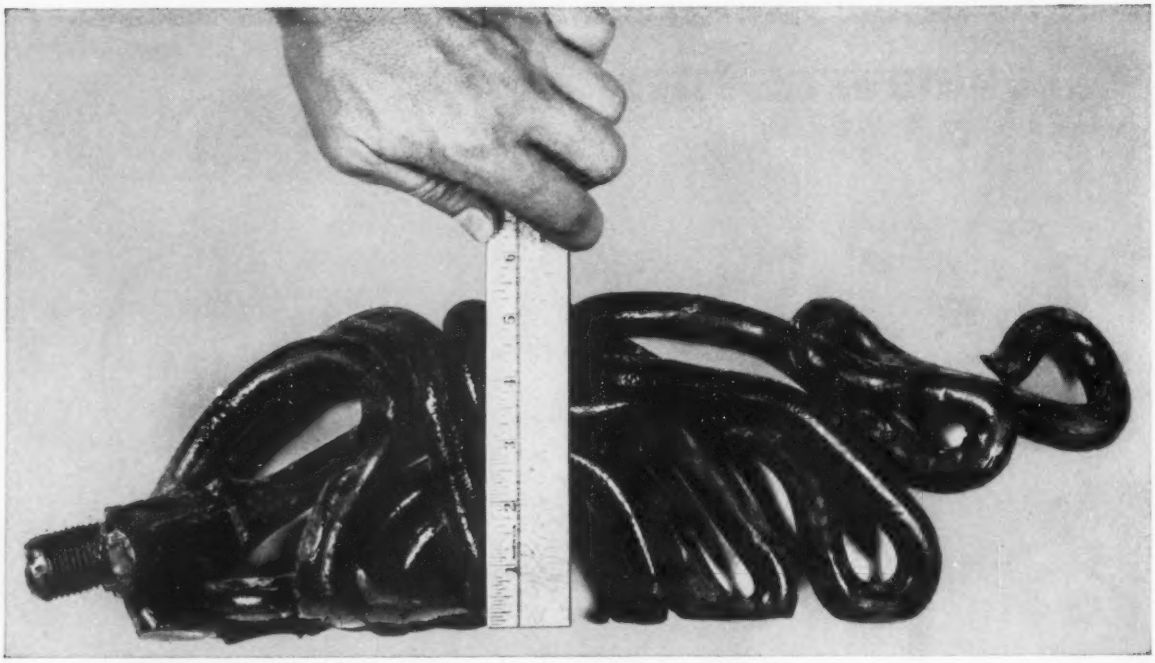
Thoroughly familiar with his stock and bin locations, he sets up the saw, measures lengths, and turns out work accurate to 1/32". Almost any conceivable sawing job is handled on these machines, from the smallest, most delicate work to heavy beams, up to 18". They will cut-off bar stock, pipe, tubing, moulding and structural shapes – saving hours of machining time.

The MARVEL No. 8 vertical column design, table height working surface, easy accessibility to simple operating controls, fast and positive power or manual feed control, column and blade tilting to any angle up to 45° right or left of vertical for cutting at an angle or mitre – are just a few design and operating features that make MARVEL No. 8 Band Saws the best all-around saw you can buy.

For the complete story, write for the new Bulletin 875, which illustrates and describes this outstanding universal metal cutting saw.

ARMSTRONG-BLUM MFG. CO.
5700 BLOOMINGDALE AVENUE, CHICAGO 39, ILLINOIS

Metal Cutting **MARVEL SAWS**
Better Machines–Better Blades



This steel "pretzel" was 14 feet long!

Down near Caprock, New Mexico, they're still talking about it . . . the nickel alloy steel sucker rod that squashed into 18 inches.

It took an accident to demonstrate real toughness.

The sucker rod, a long shaft connecting power at the surface with a piston thousands of feet below, was operating rhythmically. Its reciprocal motion brought up oil in rich spurts.

Suddenly, part way down, the well casing broke, trapping the sucker rod. Fourteen feet of rod were quickly crammed into 18 inches. But despite violent twists the sucker rod *didn't break!* See for yourself!

Nickel alloy steel provides toughness... plus fatigue resistance

Stresses on sucker rods from the pumping motion are high, and fatigue life must be extended as far as possible even in corrosive wells. That's why this one was made of AISI 4820 steel – a high-strength nickel alloy steel containing 3.5% nickel and .25% molybdenum.

It's a quenched and tempered steel. Normally a carburizing grade, 4820 specially quenched and tempered gives excellent toughness along with through hardness and relatively high strength.

Typical mechanical properties are:

Ultimate strength	120,000 psi
Yield strength	110,000 psi
Elongation	25% in 4 x diam.
Reduction of area	68%
Brinell hardness	241
Izod impact	90 ft. lbs.

We don't know of many better illustrations of the toughness and ductility of high strength nickel alloy steels than this one.

At any rate, down near Caprock, New Mexico, they're still talking about it.

If you'd like to know more about high mechanical properties of Nickel Alloys Steels . . . their strength, toughness, ductility and resistance to corrosion fatigue, for example, send for "The Properties of Heat Treated Wrought Nickel Alloy Steels."

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street INCO New York 5, N. Y.

INCO NICKEL

NICKEL ALLOYS PERFORM BETTER LONGER

Potomac Curtain

Adding to the confusion on the Potomac resulting from Sputniks I and II is the curtain dropped by the Defense Department on essential information needed by industry.

For contrast, let's turn back to World War II. In February, 1942, Donald B. Nelson, war production director, called the editors of STEEL and other business publications to Washington. Mr. Nelson said many of the golden months in which the nation could have prepared were wasted. Only ten months remained in crucial 1942 to stop the onrushing enemy. One plane or tank made in 1942 would be worth ten made in 1943.

The business publications were asked to give industry the word on what was needed and how to make it—and to do it quickly. Washington had no way to establish lines of communication except through time-consuming contact work in the field.

The publications told industry where to get contracts, what materials were needed, what the production problems were, and how to solve them through improved techniques.

Industry, fully mobilized, literally swamped the enemy with airplanes, ships, field artillery, tanks, and other materiel that streamed from its factories.

The situation today is potentially more serious than the one we faced in World War II. Only the cast and setting are changed. We are faced by a more formidable and ruthless enemy. His industrial might is comparable to our own, and he is armed with new weapons that can bring a new conflict to our shores at any moment.

The pressing problem is how to catch up with the Russians quickly on missiles. The solution requires suppression of the rivalry, bureaucratic bungling, and inefficiency among the armed services.

More than that, it requires lifting the curtain on information needed by industry so it can help the nation out of its dilemma.

That the Pentagon is not doing.

Irwin H. Such

EDITOR-IN-CHIEF

P.M. of another good day

"Good" because this Inland Steel mill representative has just spent the day with a customer. Tired though he is, he's had the satisfaction of helping another steel user solve a knotty problem. That's his job—his and other Inland men like him who bring expert metallurgical knowledge to every assignment. They can help you select proper steels, establish specifications and may even suggest techniques to speed production, lower manufacturing costs. It's this kind of service that makes it good business to call on Inland for your steel needs.

INLAND STEEL COMPANY • 38 South Dearborn Street • Chicago 3, Illinois

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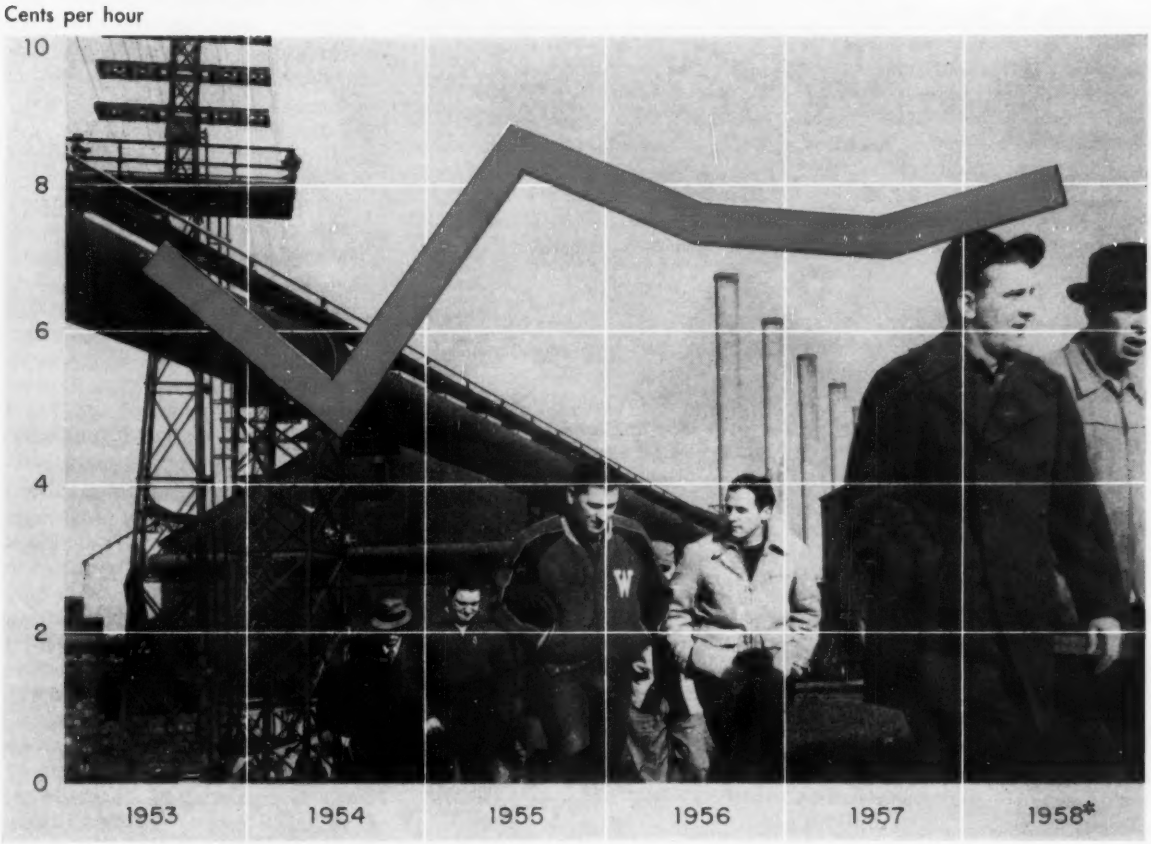
Average Negotiated Wage Boost in '58: Still High?



*Estimated by STEEL. Source for other figures: Associated Industries of Cleveland, for bellwether northern Ohio area.

'58 Worries Labor Unions

Auto workers show some signs of moderation, but they'll still seek a 40-cent package, plus the short week. An auto strike is likely next year, probably against GM

AN AUTO STRIKE, probably against General Motors Corp., next June 1 is likely.

Although the expiration date for GM, Ford Motor Co., and Chrysler Corp. contracts is still six months away, enough indirect maneuvering has already taken place to indicate the strong possibility of an impasse. Examples: The "$100 affair" at which United Auto Worker President Walter Reuther suggested and auto companies rejected a price reduction on 1958 models; speeches on both management and labor sides which indicate positions that are poles apart.

Why GM?—Ford, Chrysler, and American Motors Corp. all want to bargain jointly with the UAW as an industry. GM favors separate negotiations because it believes its bargaining abilities are superior and because it doesn't want to be bound by an industry compromise. The UAW also favors separate parleys because it has waxed strong on divide-and-conquer tactics. If the union goes after anyone but GM first, it fears the chance of a near-united front against it.

That's the main reason GM will probably be the prime target next spring. It is also in the best position economically to stand a strike, if there is one. The UAW is no charitable organization, but it doesn't want a strike to ruin a company. On the basis of ability to weather a walkout, Ford would be target number two.

The Pattern—Whatever the auto agreement turns out to be, it will prove the most important settlement in 1958 because it will set the pattern for others next year

Fringe Benefits: Average Hourly Cost per Employee

(For northern Ohio firms surveyed by Associated Industries of Cleveland)

	1955	1957
Bargaining & Grievance Time	$0.0042	$0.0047
Bonuses (excluding production)	0.0332	0.0299
Cafeterias	0.0069	0.0044
Credit Unions	0.0036	0.0011
Death in Family (pay for time not worked)	0.0017	0.0024
Education	0.0023	0.0038
Free Coffee, Milk, etc.	Not Included	0.0066
Gifts & Awards	0.0041	0.0315
Holidays (pay for time not worked)	0.0513	0.0570
Insurance		
Group Life	0.0125	0.0128
Sickness & Accident	0.0122	0.0158
Hospitalization	0.0192	0.0278
Surgical-Medical	0.0086	0.0082
Hospitalization (Surgical-Medical)	0.0358	0.0470
Total Cost of Group Life, Sickness & Accident, Hospitalization (Surgical-Medical)	0.0510	0.0623
Jury Duty (pay for time not worked)	0.0021	0.0016
Legally Required Payments		
Old Age & Survivors Insurance	0.0396	0.0483
Unemployment Compensation	0.0107	0.0112
Workmen's Compensation	0.0136	0.0163
Total Cost of Old Age & Survivors Insurance, Unemployment Compensation, Workmen's Compensation	0.0638	0.0729
Lunch Periods (pay for time not worked)	0.0259	0.0307
National Guard, Army & Naval Reserve (pay for time not worked)	0.0006	0.0004
Pensions	0.0869	0.1142
Profit Sharing	0.1120	0.1720
Recreational Activities	0.0058	0.0063
Rest Periods (pay for time not worked)	0.0639	0.0811
Severance Pay	0.0026	0.0007
Sick Leave (pay for time not worked)	0.0471	0.0391
Supplemental Unemployment Benefits	0.0500	0.0381
Uniforms, Work Clothes, Gloves, etc.	0.0052	0.0070
Vacations (pay for time not worked)	0.0851	0.1083
Wash-Up Time (pay for time not worked)	0.0314	0.0312
Welfare Funds (Money, Flowers, etc.)	0.0043	0.0017
Miscellaneous	0.0048	0.0177
Total average cost of employee benefits	**$0.3854**	**$0.4950**
Average number of benefits per company	**11.2**	**12.1**

and even in 1959. The first big 1958 metalworking negotiations will be in aircraft next March and April. They'll be followed by: The climactic auto talks; negotiations in farm implements in July and August; and sessions (covering only employee security) in electrical equipment (General Electric Co. and Westinghouse Electric Corp.) in October.

In aircraft, look for relatively modest settlements—under 8 cents an hour for wages and less than 2 cents an hour for fringes. (International Association of Machinists will demand 26 cents in wage hikes, plus fringes.) The metalworking average for the year will be somewhat higher because the auto pattern will be higher—about 8 cents in wages (see Page 53) and 2 or 3 cents in fringes (see table at left).

UAW Demands—The auto companies would be delighted to get off with the metalworking average. At this time, it looks like the UAW will demand 30 cents an hour in wages, plus 5 cents for more pensions and insurance, 2 cents for an additional paid holiday, and 3 cents for miscellaneous fringes, including more for Supplemental Unemployment Benefits.

The 40-cent package doesn't include the short-week demand. It will be presented this way: Start premium pay after 32 weekly hours, not the present 40. To its members, the UAW will soft-pedal the possibility of reduced hours, having discovered they are not enthusiastic about less work time. Instead, it will plug the fact that a 40-hour week, with overtime beginning at 32 hours, would boost earnings by 10 per cent even if the base pay remains the same. Possible compromise: Premium hours to start after 36 or 38.

Softened? — Possibly — but not probably—those demands will be softened next Jan. 23-25 when the UAW goes into convention at Detroit to hammer out the final package. The 1958 economic outlook holds little promise of more than a 6-million sales year in autos, about the same as the 1957 figure. With such production, the automotive industry had fairly serious layoffs this year. The UAW knows it can't go too far with demands.

On the noneconomic side, the UAW will seek a two-year, not a

three-year contract. It wants worker protection in plant relocation and separate contracts for skilled employees.

UAW Position—The auto union, of course, doesn't dream of winning its full demands. In an October speech, Mr. Reuther said: "The collective bargaining road will not be strewn with roses (because of) underproduction, reduced consumer purchasing power, and the industry's price-raising in the face of lowered demand."

Students of the UAW president's rhetoric claim he sounded unusually cautious. Some management optimists believe he's trying to prepare the members for a mild settlement. As a politician, he's in a tough spot. Auto workers used to be the best paid in America. Here's how they stand now (latest figures for average gross straight-time hourly rates):

Petroleum & refining	$2.79
Blast furnace, steel	2.71
Tires, rubber	2.61
Railroad equipment	2.53
Automobiles	2.47

What's more, Mr. Reuther must settle (or strike) by June 1, while the steel employees automatically get about 10 cents more one month later. In 1957, his auto people got 6 cents in straight wage boosts, but steelmen got an average 10.4 cents (not counting cost-of-living increases in either case). To just stay even with steelworkers, the UAW chief must win 14.4 cents in wages for his men.

Auto Position—Auto companies believe their hand is strong. They'll argue that higher wages will bring on more inflation (union leaders are unusually sensitive about this). They'll play for public opinion's support, as never before. For example, GM next month will start a wide publicity campaign to show what higher wages and the short week could do to the economy.

Revelations about corruption in some unions won't directly enter next spring's talks, but indirectly that issue will play a part. It has put all labor on the defensive with the public. It's no accident that the auto companies are going to the public in '58 with their case.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

Philadelphia Story

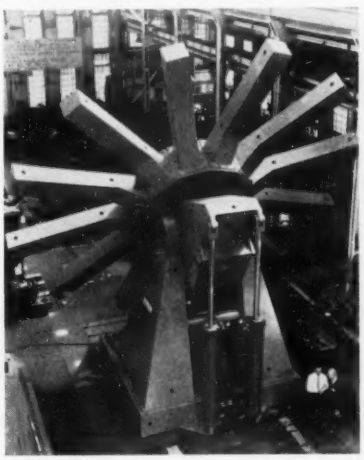
Quaker City area has steel capacity of 17 million ingot tons, 60% of eastern district

PHILADELPHIA is the center of a 100-mile circle that contains more than 60 per cent of the steelmaking capacity of the eastern district. More than 17 million tons can be made in the area annually, says Max D. Howell, executive vice president, American Iron & Steel Institute.

Mr. Howell told a regional AISI technical meeting in Philadelphia that the eastern district will produce a record amount of raw steel this year. "It will probably turn out over 25 million tons of ingots and steel for castings this year for the first time," he said.

The eastern district has increased its production 96 per cent since 1946, he said; the national rate is 71 per cent.

Foreign Ore Climbs — The increase of foreign ore shipped into Delaware River ports is even more remarkable, Mr. Howell said. The first half of 1957 saw a 20 per cent hike over the same period last year. The total for 1956 was 10.6 million tons, compared with less than 1 million in 1950.



Huge Welding Positioner

Bethlehem Pacific Coast Steel Corp.'s San Francisco shipyard built it for Mare Island Naval Shipyard, Vallejo, Calif. Weight: 100 tons. Height: Over 20 ft. Table diameter: 33 ft. A 2000-lb hydraulic system tilts the table to angles up to 60 degrees

Steel Labor Force Stable

An AISI survey of 88 per cent of the steel producing industry shows that the average age of employees in 1956 was 42; average length of service of each worker with his present employer was 13 years. The figures were the same in 1955.

Of the hourly steelworkers, 19 per cent were 18 to 29; 27 per cent were 30 to 39; 26.5 per cent were 40 to 49. Twenty-seven steelworkers out of each 1000 were over 65 and had elected to remain employed rather than retire with pensions and social security benefits.

Thirteen per cent of all hourly employees had been hired after 40.

Doxsey Aids Chilean Group

Walter S. Doxsey, former president of the American Steel Warehouse Association Inc., Cleveland, is advising a group of Chilean metalworking associations on trade association practices and policies.

A graduate of Case Institute of Technology, Cleveland, he was editor of *Daily Metal Trade,* once a sister publication of STEEL, from 1927 to 1934. Before retirement, he was president of the warehouse association for 21 years.

While in Chile, he will help found an institute for all steel producers in Latin America. It will compile steel and iron statistics for Latin America and—in co-operation with the American Iron & Steel Institute—for the Western Hemisphere. Twenty other U. S. associations in the steel industry will also participate.

Mr. Doxsey's address in Santiago, Chile, will be the Hotel Carrera.

Give Utility Program Cost

Under the three postwar planning programs for water and sewerage construction projects partially financed by the federal government, 1373 remain to be built, reports the Department of Commerce. They will require about $880 million for completion, in terms of 1956 construction costs.

The Next Ten Years in Appliances

	CABINET RANGES		CUSTOM RANGES		REFRIGERATORS	
Year	Shipments	% Saturation	Shipments	% Saturation	Shipments	% Saturation
1967	900,000	17.2	1,600,000	19.8	5,100,000	97.15
1963	900,000	21.8	1,150,000	11.7	4,500,000	96.9
1961	950,000	24.0	925,000	8.1	4,100,000	96.7
1960	975,000	25.0	800,000	6.5	3,900,000	96.5
1959	1,000,000	25.8	650,000	5.1	3,700,000	96.3
1958	940,000	26.3	500,000	4.0	3,500,000	95.9
1957	920,000	26.8	420,000	3.1	3,320,000	95.4

	DISHWASHERS		DISPOSERS		AUTOMATIC WASHERS	
Year	Shipments	% Saturation	Shipments	% Saturation	Shipments	% Saturation
1967	1,140,000	14.4	1,200,000	17.5	4,100,000	51.2
1963	750,000	10.1	870,000	12.9	3,950,000	49.2
1961	600,000	8.3	730,000	10.9	3,750,000	45.6
1960	540,000	7.5	660,000	9.9	3,650,000	43.3
1959	475,000	6.6	600,000	9.0	3,450,000	40.5
1958	415,000	5.9	550,000	8.2	3,200,000	37.7
1957	360,000	5.2	500,000	7.4	2,800,000	35.0

● Hotpoint Co. predicts the electric appliance industry will ship about 286 million major appliances with a value exceeding $85 billion during the period. Sales of built-in ranges will increase ten times. Water heaters will find only a replacement market. Washer-dryer combinations will move to replace single units; color will overtake black and white TV, according to the firm's ten-year forecast.

FREEZERS		AIR CONDITIONERS		WATER HEATERS		WIRED HOMES
Shipments	% Saturation	Shipments	% Saturation	Shipments	% Saturation	(millions)
1,110,000	28.8	3,700,000	32.0	760,000	16.7	58.2
1,070,000	25.6	2,900,000	23.4	800,000	17.8	54.6
1,040,000	23.5	2,500,000	18.6	800,000	18.3	52.8
1,020,000	22.4	2,200,000	16.2	800,000	18.6	51.9
1,000,000	21.3	2,000,000	14.0	825,000	18.8	50.9
950,000	20.1	1,800,000	11.7	835,000	18.9	49.8
890,000	19.0	1,750,000	9.8	790,000	19.03	48.6

DRYERS		WASHER-DRYERS		TELEVISION SETS		WIRED HOMES
Shipments	% Saturation	Shipments	% Saturation	B/W Shipments	Color Shipments	(millions)
1,925,000	27.1	1,900,000	15.0	2,600,000	8,500,000	58.2
1,675,000	21.7	1,100,000	7.0	4,800,000	5,200,000	54.6
1,500,000	18.1	700,000	4.0	7,200,000	2,000,000	52.8
1,400,000	16.2	550,000	2.8	7,700,000	1,000,000	51.9
1,300,000	14.4	400,000	1.9	7,700,000	450,000	50.9
1,150,000	12.6	260,000	1.2	7,350,000	300,000	49.8
900,000	10.8	165,000	0.7	6,800,000	200,000	48.6

Starts Mining Rutile

Metal & Thermit Corp. re-enters domestic market with $1.25-million investment in Virginia

METAL & THERMIT Corp., New York, is making a bid for the domestic titanium ore (rutile and ilmenite) market. It's counting on its mine and ore processing plant in Hanover County, near Richmond, Va., to supply 12 per cent of the nation's rutile needs next year. About 70 per cent now comes from Australia. Florida (see STEEL, Sept. 2, p. 97) and South Carolina were the only two previous domestic sources.

The processing plant has a capacity of 100 tons per hour. Its annual output is rated at 5000 tons of rutile, worth about $1 million. Rutile and ilmenite reserves on the 800-acre tract are expected to last 10 to 20 years.

Operation—Ore will be stripped at depths of 1 to 18 ft. Via a belt conveyor, it will be fed to an outside hopper, then to the processing plant. After being crushed, ground, and separated by water, gravity, electrostatic and magnetic devices, it will be kiln dried and bagged.

A water recycling process prevents contamination of the nearby South Anna River. Water is taken from the river, piped to the plant, then sent to a waste disposal system where the silt settles into 20 acres of wasteland.

Markets — Titanium production takes about 50,000 tons of rutile annually. In 1956, about 13,000 tons went into coatings for welding electrodes—by 1960 this market is expected to hit 20,000 tons. Other uses, accounting for some 7000 tons in '56, are in the manufacture of chemicals, ceramics, and glass.

Ilmenite serves as the basis for white pigments in paints, lacquers, varnishes, rubber, linoleum, and textiles. The U. S. consumed 865,000 tons in 1956.

Edwards Adds Third Plant

Edwards Co. Inc., Norwalk, Conn., reports that its new plant at Pittsfield, Maine, is operating at near capacity. Full operation is expected before the end of the year, when employment will reach 125. Products produced include doorbells, buzzers, door openers, transformers, pushbuttons, and contact devices.

Maker of Controls Builds

Controls Co. of America is building a 20,000 sq-ft manufacturing plant at Crystal Lake, Ill., for its wholly owned subsidiary, Lake City Inc. The plant, expected to cost about $180,000, will be in operation in early 1958. It will employ 200 to 300 to make automatic timers and synchronous timing motors. Lake City's present quarters will be leased or sold.

The company is also building a plant at North Manchester, Ind.

Detroit Firm Expands Lab

Michigan Chrome & Chemical Co., Detroit, broke ground at its Grinnell Avenue plant for an 18,000 sq-ft laboratory addition. It will be used by the firm's plating and chemical divisions.

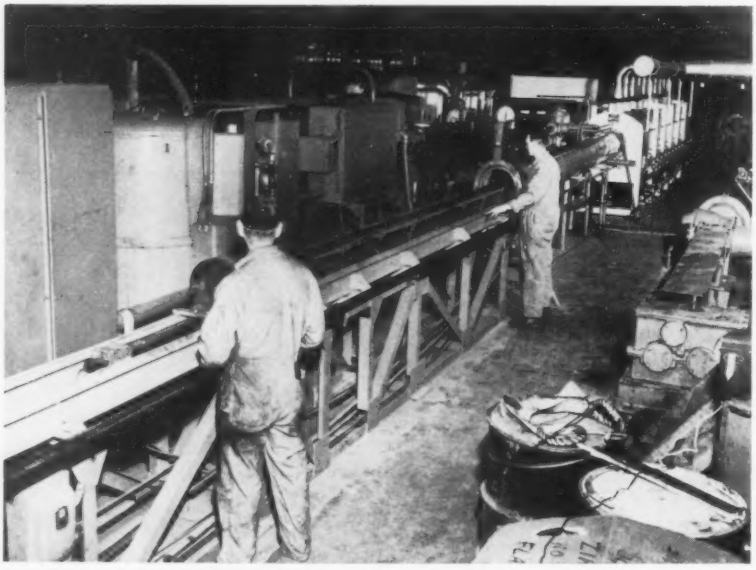
Special sections will be assigned to plating control, new product research, chemical product development, and technical service. Also included will be a plating pilot plant, chemical pilot plant, instrument lab, library, light equipment room, and conference room.

J&L Gets More Water

Jones & Laughlin Steel Corp.'s Aliquippa (Pa.) Works can now pump 345 million gallons of water per day from the Ohio River. By means of underwater construction, bridge building, tunneling, and crosscountry pipe laying, Dravo Corp., Pittsburgh, boosted the supply 40 million gallons.

Installed were two 40-million-gallon per day pumps (one is on emergency standby), traveling water screens in the river intake, a bridge, three-quarters of a mile of 42-in. line from the pumping station to rolling mills, and a 40-ft tunnel that's 17 ft below the mill's floor. Also added was a third line to the five Aliquippa blast furnaces to provide uninterrupted water service.

Divers had to remove 25 tons of steel which were 30 ft underwater to install the intake water screens.



Furnace Treats Zirconium for Atomic Reactor Use

Wolverine Tube Div., Calumet & Hecla Inc., built this special furnace at its Detroit plant to treat zirconium alloy tubing under vacuum. (Furnace gases contaminate the metal.) A ram pushes the tubing through the cooling section into the furnace; it's heated and the ram pulls it back into the cooling section

GSA To Sell Nicaro Plant

Ample supply, the administration's policy to get out of competition with private industry, and no fear of a giveaway under present conditions prompt the offer

THE GENERAL Services Administration is campaigning to get rid of its nickel plant at Nicaro, Cuba. It sent brochures to over 300 U. S. firms, offering to sell or lease. About 20 have expressed interest. A few have sent representatives to Washington and Cuba to dig up operating facts and check profit potentials.

Inco Is Out—The facility with an annual capacity of 50 million lb will not be sold to a foreign firm, which eliminates International Nickel Co. But, says a GSA spokesman: "We would favor some sort of private Cuban participation in the ownership." GSA unofficially does not look forward to the Cuban government buying in.

The plant is being operated for the U. S. by a subsidiary of National Lead Corp. Its contract expires Dec. 31, but it will be extended to cover the bidding time.

Timetable—GSA hopes to call for sealed bids by Dec. 31 and announce the winner by March. The possibility that National Lead will stay is strengthened by a GSA spokesman's comment that one firm wants it that way. National Lead may submit a bid.

GSA is advising all bidders to submit offers to buy and lease. It is generally agreed in Washington that a sale is preferred, but GSA will lease if it doesn't get a price that will stand up before Congressional criticism and meet its stated decision to take nothing less than $85 million.

GSA is offering full co-operation to all interested bidders because of the complicated nature of Nicaro. One firm estimates it will cost it $100,000 to prepare a bid. After running the facility for five years, National Lead has good insight into its potential—presumably, that's one reason for GSA's open-door policy on information.

Over Capacity—In October, the plant produced 4.2 million lb, a little better than its capacity. November also ran over, with 19 of 21 furnaces operating. (Two are always down for maintenance.)

Sales Clauses—A buyer, says GSA, will have to make 75 per cent of his production available to U. S. consumers at current market prices. The sale will also be subject to the National Reserve clause, keeping it available for defense needs.

The agency is negotiating with Cuba on taxes. The government pays none. Cuban laws allow special benefits for new industries, so the buyer could receive exemptions to the point where he paid a tax of only about 17 per cent of net income.

Ample Supply—All ore now comes comes from a subsidiary of Freeport Sulphur Co., though under that contract, only one-third of Nicaro's consumption must come from there. The contract can be canceled on six-month notice. GSA believes it can be assigned to the new owner.

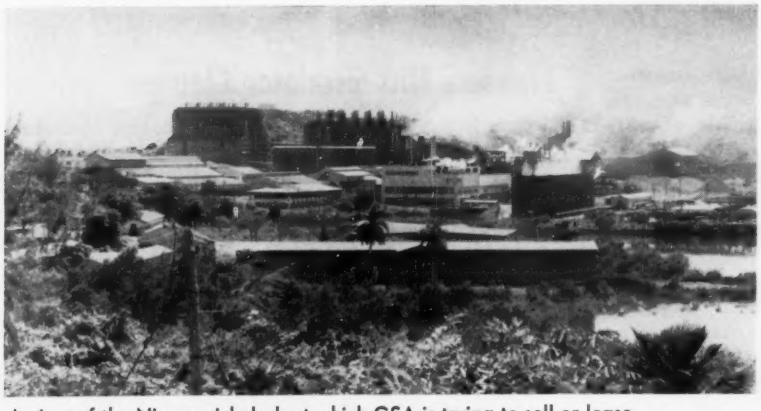
However, in 90 days, a railroad will be completed which will enable Nicaro to get to U. S.-owned ore bodies never before touched. They will be sold with the plant and railroad. There is a 17-year supply (39 million tons) of ore there, compared with a 25-year supply belonging to Freeport.

Labor Situation—GSA discounts civil strife in Cuba, reporting there has never been any trouble at Nicaro. The plant has 3140 employees, but 900 are on construction projects. Normally, it takes 2400 men to run the unionized plant. Annual labor turnover is less than 1 per cent.

Financial Statement—As of Aug. 31, Nicaro shows assets of $87 million, including $1.2 million in cash, $1.2 million in accounts receivable, $12.5 million in inventories.

Net sales were $22.4 million in the year ended June, 1957. Net profits were $5.2 million. The ratio of profits to sales must take into consideration the tax arrangements with Cuba. Sales in the 1955-56 fiscal period were $16.8 million, with profits of $2.9 million.

Sinter production from the 1955-56 period to the 1956-57 period jumped from 28.6 million lb to 31.3 million lb. Ingot output went from 2.8 million lb to 14.3 million lb.



A view of the Nicaro nickel plant which GSA is trying to sell or lease

Plans Center for Societies

A $10-million United Engineering Center is planned for the United Nations Plaza in New York City. It will serve as headquarters for 16 national engineering societies, replacing the Engineering Societies Bldg. in New York. Occupancy is scheduled for the fall of 1960.

The building will be financed by $2 million from present sources, $3 million from society members, and $5 million from a business and industry campaign.

Do Defense Dollars Keep Economy at Par?

TO PUT the question another way: Does spending for defense contribute to, or detract from, the national wealth? You have heard this statement: We are spending ourselves into bankruptcy!" You have also heard: "Without defense dollars, we'd all be out of work!"

Both are extremes, but the question should be resolved, says the Joint Economic Committee's Subcommittee on Fiscal Policy. With sputniks aloft, Rep. Wilbur Mills (D., Ark.) admits his group is not ready to cut the Defense Department's budget, but, he believes, along with many sincere congressmen, that we can't write a blank check payable to the Pentagon.

When Congress returns in January, some enthusiasts (perhaps more than we expect) will be ready to write that check. The administration says we can compromise; how well it controls the headstrong Congress remains to be seen.

Crash Programs Are Outlined

Here are two examples of what Congress will soon be talking about: 1. The Army's plan to spend $7 billion on an antimissile missile. 2. Sen. Henry Jackson's (D., Wash.) proposal for 100 atomic submarines at $45 million each. Equipped with the Polaris missile, they would cost over $5 billion.

That money would provide an immediate stimulus, agree most economists, but the long range effect might be something else, some argue. The submarine dollars might directly affect our capacity to deliver heavy plates to normal users, while the antimissile dollars could tie up enough scientific personnel to slow consumer product development.

There is no rule of thumb to calculate the most compatible level of spending, although some administration economists argue this way: Russia appears to be operating at her maximum capability. If she is ahead of us at all in development and production of the ICBM and IRBM (and perhaps more fantasic weapons), she is as far ahead of us as we can allow. Any increase in our defense effort will shorten the gap. Administration economists say we need not endanger the economy with a defense budget of, say $50 billion (with corresponding tax hikes or deficit spending); we need one of only about 10 per cent of our gross national product (GNP), $43 billion at most, to enable us to close the gap rather fast.

10% of GNP Will Support Defense

Assuming a normal rise in GNP of $15 billion annually, we can afford to boost our defense budget $1.5 billion a year. We are currently supporting a defense budget of 10 per cent of the GNP. If tax receipts hold, we can pay for it out of new income without any tax hikes.

That's the way we may attack the defense budget for fiscal 1959. At the Mills hearings, David Novick, chief cost analyst for Rand Corp. (a nonprofit group specializing in futuristic weapons), pointed out that we cannot spend much more in fiscal 1959 than we did in 1958 because we didn't make the plans in 1955 or 1956. Leadtime on the new weapons, including missiles, is the determining factor.

Hints from high government officials indicate a spending program of $40 billion at the most for defense (not including foreign aid) next year. If we incorporate the new weapons programs for manned satellites, for example, into our budget, we won't spend much more money for at least another two years.

Consensus: A spending program of $45 billion in fiscal 1960 is probably realistic, in terms of both needs and ability to pay.

Atom Power Czar Is Added

Since sputniks, we've added a man (a special science adviser to the President) to the corps of people most responsible for our defense. We have given our missile chief a little more responsibility. And we will name a space weapons manager soon. Last week, the Pentagon continued to fatten the line-up by giving Air Force Maj. Gen. D. J. Keirn, chief of the Atomic Energy Commission's aircraft reactors branch, the additional duties of heading a Defense-AEC project on atomic power for aircraft and missiles.

The move was reportedly at the request of the Joint Atomic Energy Committee, which continues to be excited about neglect of the atom-powered airplane. One Pentagon source figures Russia will beat us to that, too.

Flanders Hits Escalator Clauses

Sen. Ralph Flanders (R., Vt.), a machine tool company owner, hits escalator clauses as "disastrous" to industry and labor. Seeking a formula for basing wage boosts on productivity increases, the senator suggests Congress take a look at the possibilities of dividing profits achieved by automation into three equal parts: 1. As a wage hike. 2. As profits. 3. As a reduction in the cost of goods.

The idea found some favor before Rep. Wright Patman's (D., Tex.) Economic Stabilization Subcommittee. Representative Patman, incidentally, recognizes the good in automation, as well as its necessity.

Now you can get standard sizes in C/R End Face Seals!

Chicago Rawhide now announces the availability of a complete new line of Standard End Face Seals to meet the widest possible range of sealing requirements. For sizes or conditions beyond the range of Standard End Face Seals, C/R engineers will continue to cooperate with you on special designs. Their experience in sealing applications is unmatched — your assurance of getting the correct seal for the job.

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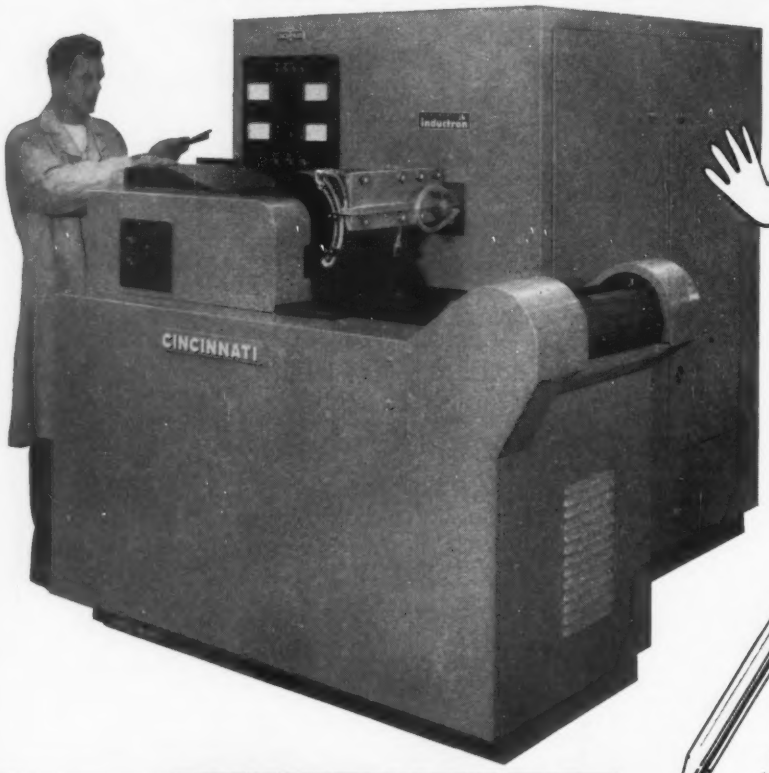
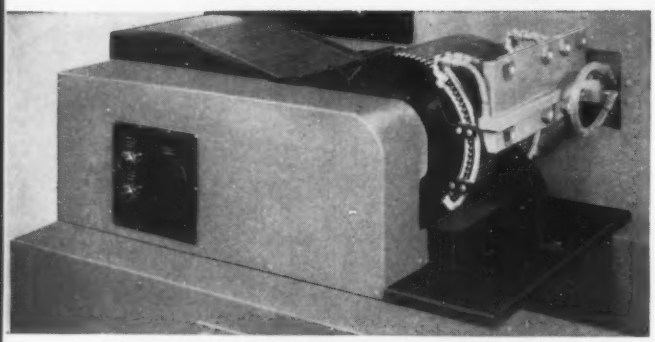
new Cincinnati Inductron hardens push rods at 1-per-second rate!



Induction hardening both ends of automotive engine push rods is accomplished at a rate of 3600 parts per hour by this new 15-kw Cincinnati Inductron®, operating at 1.2 megacycle frequency. Except for hand loading the parts into a chute, operation of the unit is automatic. Rods are gravity-fed into a "ferris wheel" which carries the parts through the work coils. Heated parts drop into the oil quench bath at one second intervals. Quenched parts are carried from the tank to tote bins by a conveyor.

This installation is one of many possible Cincinnati Inductron adaptations for the high speed selective hardening of small parts, thin walled and other parts requiring shallow case and narrow transition zone. In addition, the Inductron is equally well suited for low production operations on a wide range of work, using easy-to-form work coils. These high frequency machines are built in water or air cooled 15-kw and 30-kw, and water cooled 50-kw capacities.

You'll profit by taking your selective surface hardening problems to Cincinnati—builders of *both induction and flame hardening machines.* Call in a Process Machinery Division field engineer. He is ideally equipped to evaluate your needs and give you unbiased recommendations as to the most economical equipment for your work.



Close-up view of fixture, which accommodates two sizes of push rods, 5/16" x 10" and 5/16" x 11½". Part material is SAE 1065 steel. Controls include heat and fixture start-stop push-buttons and speed control knob for varying the rate of fixture rotation.

Micrograph showing push rod tip hardness pattern. Hardness achieved is 58-62 Rockwell C, with .050" minimum case depth. Hardened area extends 5/32" back from rod tips.

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THE CINCINNATI MILLING MACHINE CO.

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Warner & Swasey Co.

Valves Show Steady Rise*

	Sales
1957	$1,359,000,000†
1956	1,270,400,000†
1955	1,104,660,000
1954	969,500,000
1953	977,850,000
1952	958,200,000

†Estimated by STEEL.
Other figures: Census Bureau.
*All valves, except plumbing.

Expanded applications for hydraulic control types help . . .

Valve Sales Hit Record

WHILE MANY industries find their sales leveling off or declining in 1957, valve producers expect to set another record. They're looking for a 7 per cent increase in dollar volume.

The main reason for the showing is the tremendous growth of hydraulic control valves. Sales have climbed over 400 per cent in the last ten years to a dollar volume of $160 million plus this year.

Outlook—Not quite so bright is the picture for 1958. While half the producers queried by STEEL expect sales to continue at this year's level, 30 per cent think 1958 will be worse; 20 per cent expect sales to keep on climbing.

C. B. Hunt & Son Inc., Salem, Ohio, thinks sales in 1958 may be off slightly but that another upturn will begin late in the year. Proving its optimism, the firm is adding 27,000 sq ft of manufacturing space and spending $100,000 for new equipment. Several firms specializing in solenoid-operated valves are looking for 10 to 20 per cent higher sales in 1958. The reason: Continued emphasis on automation.

Says one Eastern manufacturer: "Valvemakers traditionally don't feel the leveling off as soon as some of the other component people. It's possible that our business will dip during the first half of 1958." Some such signs are already showing. Backlogs are generally about 15 per cent below their year-ago levels. Most producers report orders have slowed down slightly in the fourth quarter.

New Horizons—In addition to the numerous new applications found each year, whole new markets are now opening in nuclear power, missiles, and high pressure chemical systems. Lawrence Gardner, president, Airmatic Valve Inc., Cleveland, says 347 stainless has a fine potential in missiles because of its resistance to varied atmosphere, temperature, and fungus conditions.

Bronze and brass continue to be the materials most used, though stainless, 5 per cent nickel iron, and aluminum have gained wide popularity in the past year. Carbon steel and cast iron continue to hold a big chunk of the market. Some copper is used. Edward Valves Inc., East Chicago, Ind., reports that 18-8 stainless steels show the best growth potential. Robert G. Hess, executive vice president, Walworth Co., New York, feels that recent advances in nodular iron will increase its use for valves.

Growing — Polyvinyl chloride sales have doubled in the past year. PVC is used in valves for oil and gas, irrigation, food, and chemical processing industries. Its growth potential is good because it offers: 1. Corrosion resistance. 2. Lightness. 3. Smooth interior walls. 4. Resistance to galvanic and electrolytic action. 5. Low maintenance cost.

On the minus side: Its strength is less than one-fifth that of steel; it loses shape at high temperatures.

Competition — Price cutting is prevalent in the industry. Says one Midwest producer: "There are over 700 firms that make valves. A lot of the business is done on fixed price contracts. We throw away our price lists when we bid on these long term jobs." Low cost imports from Italy and Japan are a complicating factor.

Sales blossom better, says DeVilbiss, when you're . . .

Growing the New Products

WHAT else can it be used for? How can it be modified?

Seeking answers to these questions about each of its 1200 products has enabled DeVilbiss Co., Toledo, Ohio, to come up in the last two years with ten new or modified items or uses for existing ones to add to its widely diversified line.

Idea Is Born—"By accident we discovered a new application for an old product which greatly increased its sale," says Henry M. Kidd, vice president-sales. "We decided that everyday operations might be blinding us to possibilities lying all around. So we took two of our young engineers with high degrees of curiosity and formed a Products Analysis & Market Research Dept."

The two curious young men—William T. Miller and Wesley C. Smith—began a careful scrutiny of DeVilbiss' products, ranging from a tiny perfume atomizer to a 2000-lb compressor.

They spent hours studying advertisements in business magazines. Whenever they found a product that resembled something DeVilbiss makes, they dug deeper. They asked themselves: Can our product be made to do the same thing economically? Can we improve on it? Is there a market?

Wild Geese — "They went on many a wild goose chase," says Mr. Kidd, "which was to be expected." But DeVilbiss, a manufacturer of spray paint equipment, has greatly increased its sales with new applications or new products.

One day, an office machine repairman was having difficulties in the DeVilbiss office. He had to get an anticorrosive onto a small connection buried inside the wires and rods of a complicated machine. He was trying to avoid dismantling it.

Mr. Miller happened by and watched the serviceman drip the fluid into the machine, hitting everything but the connection. Mr. Miller went away and returned with a medicinal atomizer with a long, thin nozzle.

Bull's-Eye—"Will this help?" he asked. The repairman tried it. Success was immediate. "Where can I get one of these?" he asked. He was told to keep that one and DeVilbiss was off with a new product application. The item has become standard in repair kits for radio, TV, and office machines.

While on a social visit, one of the engineers watched friends go through the tedious job of changing the water in a home aquarium. The next day he was back with a small air compressor used by asthma sufferers.

It aerated the tank completely and continuously to the delight of the fish fanciers. It is now being used throughout the country for large and small aquariums.

Gun Gives Fun—A hand grease gun which DeVilbiss has long made for industrial uses was modified for use by lumbermen. Marking trees for the cutters required the worker to fight or cut his way through underbrush to daub red paint on the tree to be cut.

Now he rarely gets off his horse. He fires a glob of red paint at the desired tree from as far as 20 ft away, marking it plainly.

"All these, and others, have provided new markets for basic DeVilbiss products at little research cost except the salaries of our two curious young engineers," says Mr. Kidd.

"Our approach is probably the most unscientific anywhere, but it is paying off."

Here's an example of a project that hasn't matured yet, but which DeVilbiss hopes will eventually ripen: Mr. Smith has spent some time riding garbage barges into and out of New York doing research on the possibility of deodorizing the refuse.

Firm Expands Lab System

Federal Pacific Electric Co. has set up new testing and development units at Newark, N. J., Northampton, Pa., and Palo Alto, Calif.

At Newark, low voltage research is carried on in a lab designed for alternating and direct current studies, with currents ranging up to 10,000 amperes. The range of work includes bus duct, service entrance equipment, molded case circuit breakers, motor controls, switchboards, and panelboards.

Medium and high voltage product performance is measured at Northampton and Palo Alto. Analyzed are internal corona, transient voltage recovery rates, and mechanical, heating, and dielectric factors affecting oil circuit breakers, distribution transformers, disconnect switches, and high voltage bushings.

While important, new products will fail unless you're . . .

Growing the New Markets

WHAT do you do after you have unearthed new markets for new or present products? DeVilbiss and others experienced with this situation agree: Spurring salesmen to develop new markets when there's no promise of a quick return is one of metalworking's toughest assignments.

Brooks & Perkins Inc., Detroit fabricating firm, faced that problem when it brought out an ambulance litter that permits moving an accident victim from the scene of his mishap to a hospital bed without recourse to other carriers for any treatment he may get.

A. O. Smith Corp., Milwaukee, had trouble of the same kind when it began production of home heaters and air conditioners. Reynolds Metals Co., Richmond, Va., meets the problem every day in promoting new automotive applications for aluminum.

What Price Success?—The companies agree that it takes more than money to get results. It's hard enough to enlist the support of new salesmen, harder still to mobilize the old timers. In the absence of clearcut rules, the companies have tried these methods:

Rent To Buy—To penetrate an unfamiliar market (medical) with a brand new product (Transaver), Brooks & Perkins turned its ambulance litter over to three hospital supply companies which had large distributor organizations. For the first quarter of 1957, results were disappointing. Although the $800 Transaver cost substantially more than competing stretchers, it got little attention from salesmen accustomed to selling $30,000 x-ray machines. A jobber in Tennessee hit upon the idea of renting the stretcher to hospitals and allowing them to apply 70 per cent of the accrued payments to the purchase price. His sales have quadrupled since last spring.

In addition, Brooks & Perkins is sending its own salesmen into the field to help build up markets. Sales Manager Harry Dunne explains: "Each prospect our men turns up is handed over to the local dealer to show him we're trying to help. What our men lack in medical sales experience, they more than make up with a fresh, enthusiastic approach."

Task Force—A. O. Smith used a similar method in developing a market for its home heating and air conditioning units. Result: Sales doubled in two years. Says Stanley E. Wolkenheim, marketing director: "These products were aimed at a market which was new to us, so we trained five salesmen to sell them and to show our district representatives how to handle the products." Mr. Wolkenheim thinks the task force method works well in itself, or as a supplement to incentive quotas.

Creative Selling—Finding markets for products which haven't been developed calls for a different approach. John Blomquist, Detroit regional sales manager for Reynolds Metals Co., explains: "First we propose a new application for aluminum. Then we create a product that will function properly in the application we suggested. To sell our idea, we must convince the manufacturer that a change will save him money."

To meet Reynolds' requirements, a salesman must have high potential. "Only one job applicant in 15 is accepted," says Mr. Blomquist. "Ninety per cent are under 26. All take a 12-week course aimed directly at creative selling in an expanding market."

Does creative selling pay off? M. F. Garwood, Chrysler Corp.'s chief materials engineer, says within a few years his company will use 50 per cent more aluminum in trucks and cars than it did in 1957.

Summary—You can get off on the right foot in new markets, experts agree, by using incentive quotas, a special selling task force, extra help for distributors, or unusual devices such as rent-to-buy plans. They add up to the need for special creative approaches.

• *Extra copies of the product and market articles are available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

To Open Computer Center

Mid-Century Instrument Corp., New York, will open its $250,000 Manhattan Computer Center in February. Work on the high precision analog facility was started last June.

The firm has received security clearance and is booking time at $28.50 per hour for the use of 48 amplifiers. It expects to operate continuously seven days a week.

Robert Stern, Mid-Century president, expects many small firms working as defense subcontractors to use the facilities.

We hate to admit it but we had trouble with a

Bellows Air Motor

in Reading, Pennsylvania

Bellows Air Motors — the unique air cylinder with the built in valve — have established enviable records for trouble free performance. Operating cycles of 20,000,000 to 30,000,000 without maintenance of any kind are quite common. Fifty million cycles nothing unusual.

But trouble sometimes occurs — even in the best regulated families. A few weeks ago we received a phone call late at night. A Bellows Air Motor on an important production line had gone haywire. Could we ship a replacement immediately? We did better than that. We had a Bellows Field Engineer at his plant at 8:00 the next morning. At 9:00 the line was back in operation.

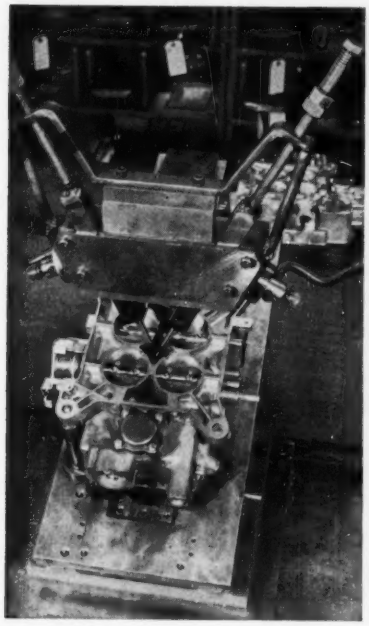
More than 125 Bellows Field Engineers (one or more in every major industrial area in the United States and Canada) are your assurance that if you ever do have trouble with any Bellows equipment it will be remedied quickly with minimum down time. (But between us girls, trouble with Bellows "Controlled-Air-Power" Devices is most unusual!)

The Bellows Co.

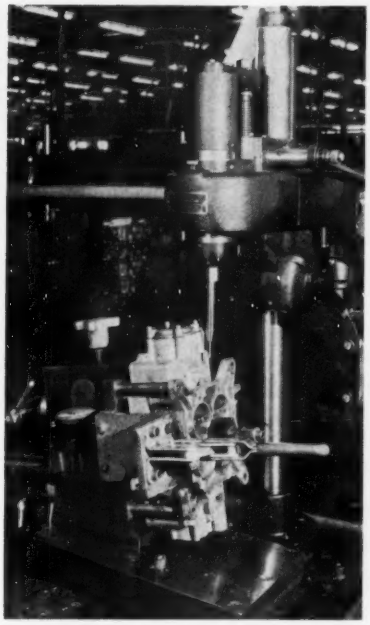
AKRON 9, OHIO

MANUFACTURERS OF CONTROLLED-AIR-POWER DEVICES FOR FASTER, SAFER, BETTER AND **LOWER-COST** PRODUCTION

830-B



This machine assembles vacuum transfer tubes and gas inlet valves into carburetors. Fixtures hold any Ford unit



A special locating fixture is used in hand drilling 0.026-0.048 in. diameter gas metering holes in carburetor bodies

Ford Makes Own Carbs

Reject rate is expected to be less than 3 per cent when all production kinks are ironed out. Rawsonville, Mich., facility turns out carburetors for all Ford cars

QUALITY CONTROL is one of the reasons Ford Motor Co. set up a line at Rawsonville, Mich., to cast, machine, and assemble carburetors for all its cars.

Until last year, the company bought aluminum carburetor shells from suppliers. This year, it's making all but a few of the bodies.

Reject Problem—As one of the aluminum companies explains it, porosity leaks and cavities in castings often can't be spotted until they've been partly machined. Ford faced the perpetual problem of having to reject large inventories of rough castings if the defects were spotted during machining. The company decided to set up its own production facilities.

It began by starting a do-it-yourself program in temporary facilities, but it went back to venders for its 1957 carburetor bodies because of its own mounting reject troubles.

New Start—A permanent line was set up when the Rawsonville plant opened this September. Ford's preliminary reject rate on carburetors has been 7 per cent—less than half the rate in its previous model run.

Ford says it expects rejects to drop below 3 per cent as early production kinks are ironed out.

Room for Errors—The line turns out 4000 castings daily, which gives plenty of opportunity for errors. "That's why we want to do the whole job—so we can spot defects and correct them quickly," says Ford.

All through casting, machining, and assembly, carburetors undergo a series of rigid inspections and checks.

Many Parts — Ford casts five basic carburetor shells, using SAE 308 aluminum. The shells are built up into ten different carburetors. Ford reports the average four-barrel carb has 270 parts, the average two-barrel 220 parts.

Since the five basic bodies are similar in appearance, Ford has to mark each type shell with colored graphite lead as soon as it's out of the casting machine.

Five different dies are used for casting, but the company has developed an ingenious single die which can trim flashing from all the shells. A water test checks for porosity leaks before the flashing is removed.

Fit Tight—Close tolerances are required in machining and assembly. They call for automatic gaging on most machining operations.

The first 40 station, in line, drilling unit, for example, has a battery of automatic gages to spot rejects at the halfway mark. Any carburetor bodies that have been spoiled in the first 20 operations are automatically shunted out of the machine.

Locating holes are kept to 0.006 in. tolerances. Hard-to-reach vacuum passage holes are automatically drilled and reamed to 0.125 in. in diameter.

But Clean—Before being transferred to the belt assembly line, machined bodies are cleaned in a bubble bath, then cycled through a sealing solution. More pressure tests follow.

"During assembly, valves and seats on each carburetor are 100 per cent vacuum tested to make sure there are no leaks," Ford adds.

Some 27 subassemblies go into the average carburetor. They are built up in the center of the as-

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sembly area. Ford is rearranging the subunits so they will flow into the assembly line at point of use.

And Ready—Finished carburetors are conveyed to flow chambers where the volume of gas going through different passages is checked, and each unit is calibrated before being packaged and shipped.

Although Ford is just starting full carburetor production, its Rawsonville plant also makes instrument clusters, heater motors, distributor bases and shafts, and powdered metal parts. The facility covers 567,000 sq ft.

Car Registration Up

Some 56.1 million cars will be registered in the U. S. this year, compared with 54.3 million registrations last year, says the American Petroleum Institute, New York.

The API also looks for truck and bus registrations to hit 11.1 million, compared with 10.88 million in 1956. The institute says it means a 3.1 per cent increase in vehicle registrations. The estimates do not include cars, trucks, or buses operated by the military services.

By mid-November, car producers had built 5.3 million passenger cars and 966,688 trucks and coaches, reports the Automobile Manufacturers Association. The total (6.2 million vehicles) compares with 5.9 million built in the same period last year.

Detroit Tooling Gains

The reported 30 per cent increase in automotive tool and die work is substantiated by Chester A. Cahn, managing director, Automotive Tool & Die Manufacturers Association, Detroit.

"It looks like the 1959 automobiles will have fairly extensive changes, compared with 1958's," says Mr. Cahn. Because of two and three year model change cycles, he points out that 1958 tooling contracts should be compared with those in 1956.

Several Detroit area shops indicate their work load for the coming year is about equal to what it was in 1956—well above last year's.

Mr. Cahn says major boosts in tool and die employment have come since the first week in October. "While employment hasn't increased 30 per cent over 1957's, we expect peak work loads after the first of the year," he adds.

Another Importer Speaks

A west coast importer of Germany's Goliath car says he expects a U. S. market of 275,000 foreign cars in 1958. In contrast, others are anticipating import sales of half a million cars next year.

Robert H. Peterson, president of Goliath Importers, U.S.A., Burlingame, Calif., believes his car will account for approximately 30,000 units.

The economy Goliath has been marketed on the West Coast for more than a year. Mr. Peterson now plans to distribute it across the country. The line includes station wagons, a convertible, and two premium models.

Port of entry prices (Los Angeles) start at $1995 and go up to $2834 for a sports coupe. The car is powered by a front mounted, water cooled engine. The 4-cylinder plant is rated at 46 hp. Fuel consumption is supposed to be around 30 mpg.

Goliath's wheelbase is 89.4 in., with an over-all length of 13.3 ft. The car weighs 2020 lb. It is closer to GM's Opel and Vauxhall in price; it's between them and the Volkswagen in size.

U. S. Auto Output

Passenger Only

	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
April	549,239	547,619
May	531,365	471,675
June	500,271	430,373
July	495,629	448,876
August	524,354	402,575
September	274,265	190,716
October	327,362	389,061
10 Mo. Total	4,994,498	4,623,829
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
Oct. 19	72,180	88,557
Oct. 26	104,987	104,269
Nov. 2	126,139	117,583
Nov. 9	136,742	132,087
Nov. 16	141,902	135,641
Nov. 23	153,917†	118,949
Nov. 30	133,400*	159,976

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

GM Holds Wage Levels

General Motors Corp. reports its 390,000 hourly rated workers will continue to receive a 19 cent cost-of-living allowance through February, 1958.

GM's allowances are based on the Consumer Price Index of the Bureau of Labor Statistics. The last BLS index is 121.1, compared with 120.8 for July 15. The change is insufficient for a wage boost. Some 106,000 salaried employees will continue to receive a quarterly cost-of-living allowance of $95.

Exhaust Notes

• *Ward's Automotive Reports* says car and truck assembly plants fell 5 per cent behind anticipated November production schedules of 615,000 cars and 95,000 trucks.

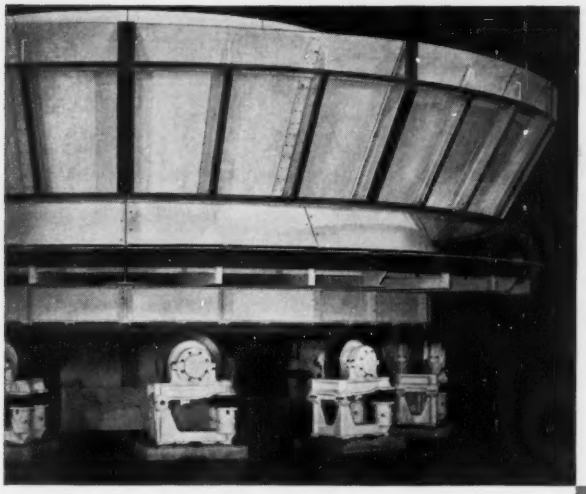
• Ford Motor Co. reports its Continental Mark III has been selling so well that its plant in Wixom, Mich., will boost production 68 per cent for December.

• Oldsmobile is scheduling 41,000 cars for December production.

• GM says it will build an auto finish testing laboratory in Miami, Fla., to replace a small facility now used there. Earl M. DeNoon, head of the Miami testing group, says the move will permit more operating space and provide better atmospheric conditions for controlled tests.

• A 10.5 per cent jump in power brake installations and a 10 per cent gain in power steering over 1956 models is reported by GM's Buick Div., Flint, Mich. Edward T. Ragsdale, general manager, says Buick equipped 61.9 per cent of its 1957 cars with power steering, 56.1 per cent with power brakes.

• Central Foundry Div. of GM has developed a stronger casting metal called 88M Armasteel. Because of its hardness (269 to 302 Brinell), it can be used without preliminary heat treating.



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the more you need HYATTS . . . because straight cylindrical roller bearings will carry far more load, size for size, than any other anti-friction type. Here HYATTS support *one million* pounds on a 50-foot sinter cooler.

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the more you need HYATTS . . . because they're built from superior steels, with precise control of internal clearances to guarantee smooth trouble-free performance in critical applications like locomotive traction motors.

THE MORE YOU NEED *Cylindrical* HY-ROLL BEARINGS

Today's more compact machine designs, which must often accommodate higher speeds and loads in less space than ever before, are showing up the shortcomings of limited-capacity bearings. That's why more and more manufacturers are turning to HYATT Hy-Rolls—the straight cylindrical roller bearings that can carry *more* radial load in *less* space. Ask your nearest HYATT Sales Engineer for recommendations—he can help you solve your problems! Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.; Pittsburgh; Detroit; Chicago; and Oakland, Calif.

THE RECOGNIZED LEADER IN CYLINDRICAL BEARINGS

1908–1958 GM FORWARD FROM FIFTY

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THE "WORKHORSES" OF MODERN INDUSTRY

(Advertisement)

COLD HEADING: A WAY TO CUT UNIT COSTS

- **Eliminates extra operations; faster than forging**
- **Metal flows to shape — without waste, without machining costs**

Here's a manufacturing fact often overlooked: The same machines that spill out large volumes of standard fasteners at surprisingly low cost can also produce *special* mechanical parts . . . also in volume and also at low cost.

It's surprising what an *expert* can do with cold heading machines. Some parts that would otherwise be two or more pieces are turned out as uniform, integral units. Parts that would otherwise require slower, costlier machining spout from the cold header with little or no scrap loss. What's more, the pieces are stronger.

Case Histories: (1) Eliminating double forging operation, high speed cold heading machine cuts and bends lengths from continuous rod to form shifter lever. It also gives greater strength, improved finish, closer tolerances. (2) Instead of a machined screw assembled with separate stamped screw driver shield, hose clamp screw is now cold headed in one piece. (3) No longer cut on screw machine, insert screw for plastics costs 40% less. Cold header uses just amount of metal required.

Call on the RB&W Fastener Man. He can tell you whether or not cold heading is feasible for producing your screw machine parts, forgings and small assemblies. If so, RB&W facilities can handle your volume needs. Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, New York.

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112th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Fargo. **Distributors from coast to coast.**

Spin-Lock Screws Eliminate Washers

Ratchet action teeth on Spin-Lock Screws bite into the seat of any surface the screw is driven into. Their tight hold requires about 20 per cent more torque to loosen than to tighten. With this strong grip, separate washers or other locking devices are unnecessary. One-piece Spin-Lock construction gives faster assembly, lowers inventory needs—and affords fasteners that will stay tight in products subjected to vibration or repeated heating and cooling. Send for bulletin.

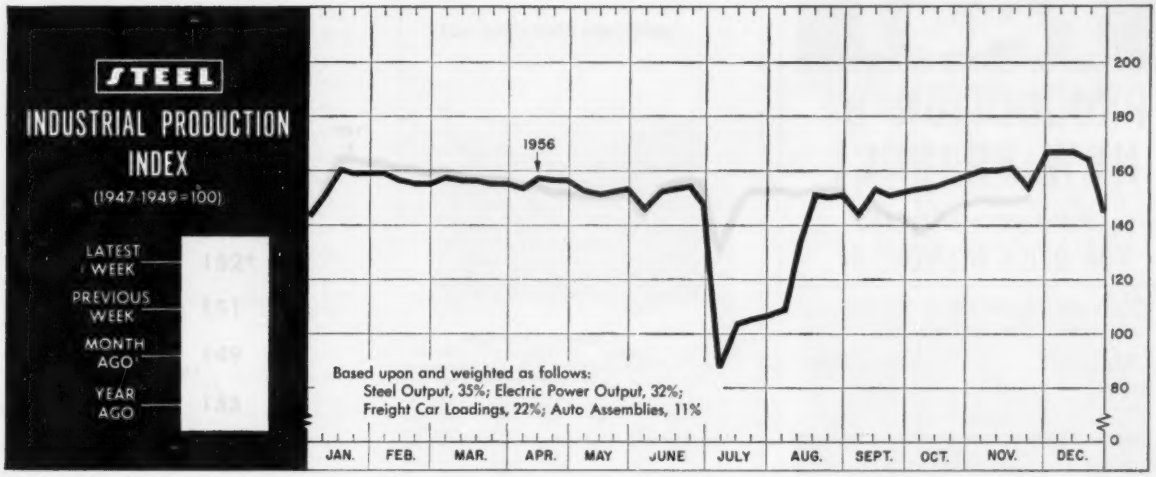
12-point fasteners cut wrench clearance space

Double hex RB&W bolts and nuts measure smaller across their points than single hex fasteners. Used with an external socket wrench, they permit optimum driving torque to be applied.

Thus, while fitting cramped spaces in compact assemblies, these fasteners also assure proper preloading for *stronger* connections.

Available with plain flange, or SPIN-LOCK design.

RB&W FASTENERS—STRONG POINT OF ANY ASSEMBLY



*Week ended Nov. 23.

Look for 'Adjustment' To Hit Its Low in '58

YOU'LL probably see another pause in the long, upward business trend next year. It'll be reminiscent of 1954 and 1949—but probably not so severe. One thing is certain: The economy is in the opening phase of a slight recession.

Production—The latest report on production by the Federal Reserve Board (see chart, Page 72) shows that when the index should have been gaining, it was losing ground from the summer's high of 145 (1947-49=100) in August to 142 in October. Between August, 1953, and the following March, the FRB index declined 9 per cent. To match that, the index would have to decline to 132 by next summer. Some economists believe it will average about 140, with a low of 135 during the summer. That would be slightly better than 1955 was.

STEEL's industrial production index (above) also indicates that the cutback started in September. Current trends point to a continuation of readings in the low 150s. During the 1954 recession, the index fell 13.5 per cent. A similar cut in 1958 would put the trend line down to 133 or 134 per cent of the 1947-49 average. It hasn't been that low since early in 1955, and it isn't likely to reach that level next year. An average of 145 would be more likely, and that would be only slightly below 1955 and 1956.

GNP—During 1954, gross national product dipped slightly to $361.2 billion. Since then it has gone up steadily to about $435 billion this year. If the over-all economy is to repeat the 1954 slump, GNP next year will be around $430 billion. That is the prediction of Sinclair Weeks, secretary of commerce. It is one of the lowest forecasts so far. Most people are predicting $435 billion to $445 billion, figuring on over-all volume about equal to this year's and allowing for 2 or 3 per cent inflation.

The main difference in GNP next year will be its composition. The

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,884[1]	1,945	2,489
Electric Power Distributed (million kw-hr)	11,950[1]	11,953	11,439
Bituminous Coal Output (1000 tons)	9,125[1]	9,400	10,327
Petroleum Production (daily avg—1000 bbl)	6,800[1]	6,831	7,195
Construction Volume (*ENR*—millions)	$332.3	$373.0	$357.6
Auto, Truck Output, U. S., Canada (*Ward's*)	186,188[1]	173,382	146,991
TRADE			
Freight Car Loadings (1000 cars)	645[1]	647	651
Business Failures (Dun & Bradstreet)	306	266	240
Currency in Circulation (millions)[3]	$31,336	$31,287	$31,269
Dept. Store Sales (changes from year ago)[3]	−5%	−1%	+6%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,575	$20,019	$25,277
Federal Gross Debt (billions)	$273.7	$273.7	$276.7
Bond Volume, NYSE (millions)	$26.6	$25.9	$23.5
Stocks Sales, NYSE (thousands of shares)	12,505	11,671	9,002
Loans and Investments (billions)[4]	$86.1	$86.3	$85.6
U. S. Govt. Obligations Held (billions)[4]	$24.8	$25.0	$25.6
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	225.92
STEEL's Nonferrous Metal Price Index[6]	205.8	206.4	256.8
All Commodities[7]	117.8	117.8	115.7
Commodities Other Than Farm & Foods[7]	125.6	125.6	124.0

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

FAST

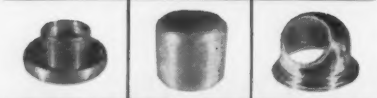
PRODUCTION OF NEW PRODUCT

Fabrications

FOR QUICK DELIVERY OF

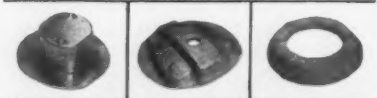
Spinformings

GUIDED MISSILES, TURBO JETS,



COMMERCIAL PLANES, PARTS,

Hydroformings



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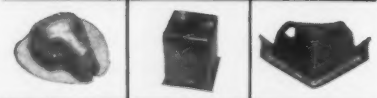

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Fabrications

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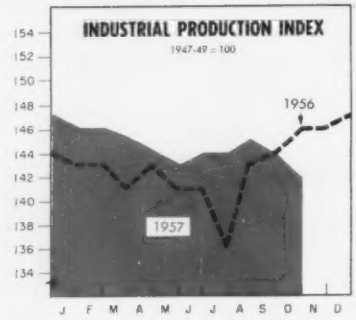
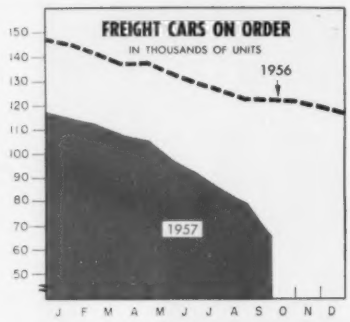
THE BUSINESS TREND





(Seasonally Adjusted)

	Total Production 1957	Total Production 1956	Primary Metals 1957	Primary Metals 1956	Metal Fabricating 1957	Metal Fabricating 1956
Jan.	146	143	144	148	180	170
Feb.	146	143	143	146	180	168
Mar.	145	141	137	145	179	167
Apr.	144	143	136	146	176	170
May	143	141	132	141	175	167
June	144	141	132	136	177	168
July	144	136	133	69	177	169
Aug.	145	143	136	125	177	172
Sept.	144	144	131	148	174	174
Oct.	142*	146	126*	147	170*	176
Nov.	...	146	...	147	...	180
Dec.	...	147	...	145	...	183
Avg	...	143	...	137	...	172

Federal Reserve Board. *Preliminary.

	Awards 1957	Awards 1956	(end of month) 1957	(end of month) 1956
Jan.	5,328	1,818	114,656	144,946
Feb.	6,065	1,675	111,965	141,437
Mar.	5,359	1,618	107,708	137,070
Apr.	6,429	6,559	105,190	137,436
May	3,423	2,403	97,006	133,072
June	4,918	2,859	91,810	129,409
July	1,251	2,642	85,229	126,194
Aug.	3,203	2,575	79,258	122,870
Sept.	3,257	3,949	71,981	122,421
Oct.	2,206	6,532	65,718	122,250
Nov.	....	4,172	.....	119,626
Dec.	....	4,992	.....	117,320
Total	....	41,794		

American Railway Car Institute.

Charts copyright, 1957, STEEL.

emphasis will be on soft goods, taking up the slack resulting from the slowdown in capital goods and consumer hard goods.

Metalworking Sales — The segment of the economy most likely to take the brunt of the decline next year is metalworking. The industry's sales this year will be about $140 billion, up from $133,538 million last year. But with capital goods expenditures on the downtrend, industrial building off, and a general softness in consumer durable goods, it would take a startling change of tide to increase sales in 1958.

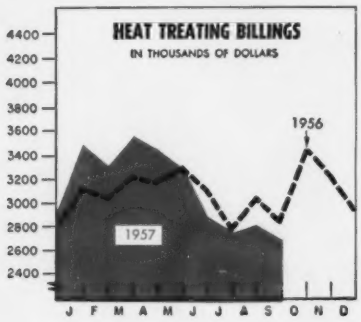
Although the recession of 1953-54 and the current downturn got their starts in September, the two situations are not too similar. Backlogs were not as high in 1953-54 as they are now, but consumers had a backlog of desire to buy which was far from satisfied. Industry was just beginning an expansion program to meet those needs. All those things helped pull us out of the spin in 1954.

Today, even though the book value of backlogs is relatively high, there is an apparent lack of desire for hard goods on the part of the consumer. Cancellations are becoming more common. So far this year, they have amounted to over 10 per cent of new orders in the machine tool industry. Backlogs of freight cars are slipping far more than the shipments-new order ratio indicates they should. And for the first time since the end of World War II, there is more than enough industrial capacity to supply consumer demand.

Between Waves—Industry must realize that this is a trough between two tremendous waves of expansion, claims William P. Carlin, economist, Republic Steel Corp. He told a meeting of the National Industrial Conference Board in Milwaukee that business indicators "show clearly that this period we are entering is only a temporary breathing spell. . . . This means that it won't be too long before we will need more plant and equipment, and the capital goods industries will be booming again . . . this period ahead may be one of real opportunity to replace obsolete equipment at reasonable costs—opportunity to prepare for the future."

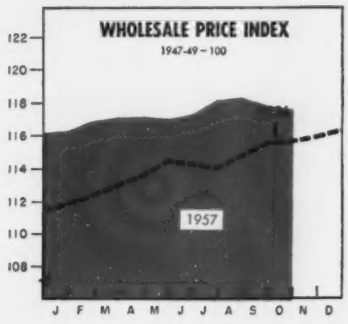
Purchasers See No Upturn

The November report of the National Association of Purchasing



	1957	1956	1955
Jan.	3,494.7	3,116.4	2,181.0
Feb.	3,337.9	3,124.8	2,184.5
Mar.	3,571.6	3,330.9	2,599.5
Apr.	3,462.6	3,166.2	2,579.5
May	3,311.4	3,350.7	2,644.4
June	2,912.1	3,094.5	2,645.1
July	2,767.5	2,737.4	2,180.0
Aug.	2,830.8	3,136.6	2,535.6
Sept.	2,708.8	2,858.6	2,666.8
Oct.	.....	3,442.3	2,897.2
Nov.	.....	3,205.7	2,935.7
Dec.	.....	2,931.2	2,891.1

Metal Treating Institute.



	All Commodities 1957	All Commodities 1956	Other Than Farm & Foods 1957	Other Than Farm & Foods 1956
Jan. ...	116.9	111.9	125.2	120.4
Feb. ...	117.0	112.4	125.5	120.6
Mar. ...	116.9	112.8	125.4	121.0
Apr. ...	117.2	113.6	125.4	121.6
May ...	117.1	114.4	125.2	121.7
June ...	117.4	114.2	125.2	121.5
July ...	118.2	114.0	125.7	121.4
Aug. ...	118.4	144.7	126.0	122.5
Sept. ..	118.0	115.5	126.0	123.1
Oct. ...	117.7	115.6	125.7	123.6
Nov. ...	....	115.9	....	124.2
Dec. ...	....	116.2	....	124.6

U. S. Bureau of Labor Statistics.

Agents points to anything but an upturn. Production and new orders have changed little from the October reports, and employment is continuing its downward slope. The agents say that all materials are in adequate supply. (It's the first time they've reported this situation since 1942.) The only bright spot in the report is the expectation that the present slowdown in inflation will continue into 1958.

Stampers Still Optimistic

There is still plenty of optimism. The Pressed Metal Institute says that 50 per cent of its reporting members expect shipments will be up an average of 15 per cent in the next three months. Another 34 per cent expect to hold to present levels, and another 10 per cent look for a downturn of about 10 per cent.

Says H. A. Daschner, managing director of the institute: "Since stampers are men of sound judgment and do not make wild guesses about their business, the fact that 84 per cent look for as good, or better, business is encouraging. . . . The companies are out beating the bushes, and it is paying off."

Trends Fore and Aft

- Machine tool net orders for October continued to decline, totaling only $27.85 million, reports the National Machine Tool Builders' Association. Shipments are holding at the $60 million level.
- Freight car builders delivered 8295 freight cars in October, but took orders for only 2206. Backlogs dropped from 71,981 on Oct. 1 to 65,718 on Nov. 1.
- Inflation has come to at least a temporary halt. Wholesale prices (see chart above) dipped in October to 117.7 (1947-49=100), while the consumer price index stood still at 121.1 per cent of the base period. This was the first time since August, 1956, that the cost of living failed to make a monthly advance.
- At the same time, weekly spendable earnings of factory production workers declined by about 85 cents from the September level. This lowered the average worker's purchasing power by more than 1 per cent.
- New orders for industrial furnaces dropped 59 per cent from the year-ago figure to $3,621,000 in October, reports the Industrial Heating Equipment Association Inc.

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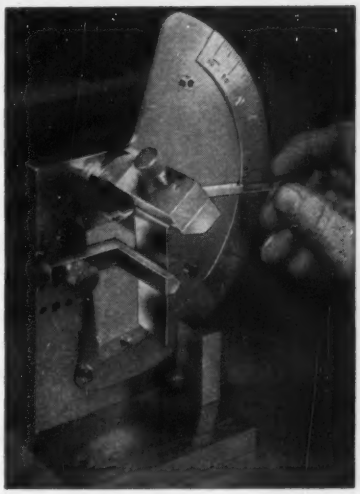

Temper requirements for the thin nickel strip (.002") used in sensitive electronic tubes were too exacting to be checked by the usual methods. So Somers carefully hand checks several samples from each lot by the ultra-precise "bend test" illustrated above.

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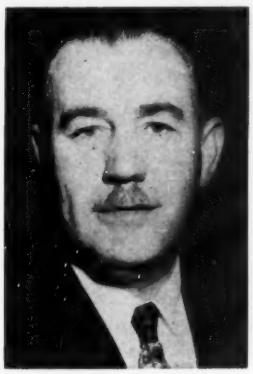
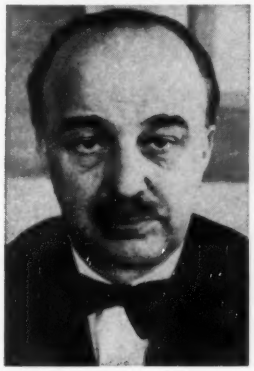
WILLIAM C. MILLER
National Precision sales mgr.



LINDSAY BLEAKLEY
E. Chicago Machine Tool post



WLADIMIR A. REICHEL
Norden-Ketay senior v. p.

ALAN R. EAKINS
Porter refractories post

William C. Miller was made sales manager, **National Precision Casting Corp.**, Paoli, Pa. He was a sales engineer with Beryllium Corp.

Lindsay Bleakley was named general manager, **East Chicago Machine Tool Corp.**, East Chicago, Ind. He joined the firm in 1950.

Quentin E. Charlesworth was appointed vice president-production, **Bristol Steel & Iron Works Inc.**, Bristol, Va. He was works manager.

Henry McConnell was made manager of **Sylvania Electric Products Inc.'s** wire plant in Warren, Pa. He was manufacturing superintendent of the plant. **Gerald L. Moran** was made general manager of the company's chemical and metallurgical division, Towanda, Pa. He was division chief engineer. **Calvin J. Sparrow** was named to the new post of manufacturing manager at Towanda.

H. Glynn Wood was made works manager; **Robert B. O'Brien**, general sales manager of the special products division of **Stromberg-Carlson**, division of General Dynamics Corp. at Rochester, N. Y. Former production manager, Mr. Wood now is in charge of engineering, purchasing, and production.

Lloyd C. Fitzgerald was made Chicago district sales manager, **U. S. Steel Supply Div.**, U. S. Steel Corp. He succeeds **Donnell W. Newman**, resigned.

Wladimir A. Reichel was appointed senior vice president, **Norden-Ketay Corp.**, Stamford, Conn. He was senior vice president for engineering at General Precision Equipment Corp.

Mervin T. Flock was named to the new post of production and procurement manager, **De Laval Steam Turbine Co.**, Trenton, N. J. **Richard P. Springle** was made purchasing agent.

Joseph S. Jonkey, former manager of product engineering at William R. Whittaker Co., joined **Consolidated Electrodynamics Corp.** as production manager of its Glendale, Calif., division.

Winston A. Shoenberger was promoted to assistant superintendent, finishing department, Campbell, Ohio, Works, **Youngstown Sheet & Tube Co.**

Richard Robertson, former sales manager, was made general manager, **Allan Herschell Co.**, North Tonawanda, N. Y.

Robert J. Beck was appointed assistant chief engineer, Jack Div., **Duff-Norton Co.**, Pittsburgh.

Allis-Chalmers Mfg. Co. appointed **W. F. Stowasser** and **W. A. Shockley** to new posts in its processing machinery department. Mr. Stowasser was named process development engineer and will also supervise operation of the Carrollville pilot plant. Mr. Shockley becomes supervisor of minerals processing machinery sales.

Alan R. Eakins was appointed general sales manager; **H. W. Gethin**, assistant general works manager, refractories division, **H. K. Porter Company Inc.**, Pittsburgh. Promoted from assistant sales manager, Mr. Eakins has been with General Refractories Co. since 1949, in various sales posts.

J. K. Ortega was named vice president and director of manufacturing at **Keystone Mfg. Co.**, Los Angeles.

Anthony Coorlim was appointed assistant sales manager of **Colson Corp.**, Elyria, Ohio. The sales department is now at the company's new Jonesboro, Ark., plant. Mr. Coorlim was assistant sales manager, Radiant Mfg. Co.

George W. Lambertson was promoted to a division sales manager of **Lunkenheimer Co.**, Cincinnati. Formerly Chicago branch manager, he is succeeded by **Jack W. Montgomery**, former sales representative at the Chicago office.

William A. Driscoll was named superintendent of **Republic Steel Corp.'s** cold strip tin mill at Niles, Ohio. He succeeds the late **George M. Kropp.**

Edwin N. Hower was appointed vice president, **Charles T. Brandt Inc.**, Baltimore. He was manager, engineering and construction sales, for Dravo Corp.

C. M. Blair was elected vice president-planning; **R. D. Glenn**, vice president - development, **Bakelite**

R. M. FRINK

E. C. WALTER

Wolverine Tube division directors

ROBERT M. POWELL

JAMES L. ROACH

Wyman-Gordon appointments

Co., division of Union Carbide Corp., New York.

Calumet & Hecla Inc.'s **Wolverine Tube Div.**, Detroit, established a separate new products division and an operations division. It named **R. M. Frink** to the new post of director, new products; **E. C. Walter**, director-operations.

Joseph D. Gavin was appointed manager of sheet and strip sales at the Chicago plant of **Joseph T. Ryerson & Son Inc.** He succeeds **Robert T. Stafford**, promoted to an executive post to be announced.

John W. Spoor was named vice president and director of sales for **Seaman-Andwall Corp.**, Milwaukee, a division of American-Marietta Co. He was formerly sales vice president, Power Products Corp. **Jack E. Davis** was elected vice president - operations; **Michael D'Amato**, vice president-engineering.

William S. Shira was appointed assistant chief engineer, **Smith Engineering Works**, Milwaukee.

George D. Nahm was made assistant purchasing agent, **Carpenter Steel Co.**, Reading, Pa. He was office manager in the purchasing department.

Frederick V. Branch was made project co-ordinator, industrial and plant engineering, at the Owego, N. Y., plant of **International Business Machines Corp.**

John J. Reardon was made industrial engineering supervisor, building products division, **American Welding & Mfg. Co.**, Warren, Ohio.

Robert M. Powell was elected executive vice president-sales; **James L. Roach**, general sales manager of **Wyman-Gordon Co.**, Detroit.

Charles Snyder was made sales promotion manager, **Stone Machinery Co. Inc.**, Manlius, N. Y. He was with Dewalt Machine Co.

John W. McCredie joined **Refractory Specialties Co.** as a sales representative at Pittsburgh. He was sales manager, refractories division, H. K. Porter Company Inc.

Orval J. Thomas was elected executive vice president of **Camedera Engineering Co.**, San Diego, Calif.

E. M. Offinger was appointed Detroit district manager, Electro Data Div., **Burroughs Corp.**, Detroit. He succeeds **James Ford**, now central regional manager for the division.

John P. Carr was named assistant central division manager, **Walworth Co.**, at Pittsburgh.

Lawrence M. Ferguson, sales manager, was elected vice president-sales, **Vulcan Containers Inc.**, Bellwood, Ill. He succeeds **Herbert B. Scharbach**, resigned. **Eugene W. Gehm** was made assistant sales manager.

Arnold Jensen was appointed manager-marketing for **General Electric Co.'s** conduit products department, Bridgeport, Conn. He succeeds the late **Raymond B. Elmendorf.**

Gordon A. Paul was appointed comptroller of **American Steel & Wire Div.**, Cleveland, U. S. Steel Corp., to succeed **Russell M. Braund**, now vice president-accounting for the corporation in Pittsburgh. **Stanley G. Harris** was made assistant comptroller at Cleveland.

W. W. Gould was made Chicago district manager, **Edison Storage Battery Div.**, McGraw-Edison Co. He transfers from Cleveland.

V. P. Masi, former manufacturing manager, Mound Road engine plant, **Chrysler Corp.**, was named plant manager, Joseph Campau engine plant, engine division, Detroit. **W. R. Gerber**, former general superintendent, pressed steel division, Dodge main plant, was appointed plant manager, Conant stamping plant, stamping division.

National Supply Co. appointed **Charles C. Brush** chief field engineer of its Spang-Chalfant Div., with headquarters in Dallas. He succeeds **Howard G. Texter**, retired. **Dane O. Egbert** was made San Francisco district manager for Spang-Howarduct Div.

Electro Metallurgical Co., division of Union Carbide Corp., assigned **Dr. Doyle Geiselman** to the metals research group, Metals Research Laboratories, Niagara Falls, N. Y., as a research metallurgist; **Arnold E. Hultquist** to the chemicals research group as an assistant research chemist.

Harold J. Goldman was made assistant sales manager for the southwest region by **Rolled Steel Corp.** He is at Houston.

Hugh Kane joined **William F. Horsch Co.**, Grosse Point, Mich.,

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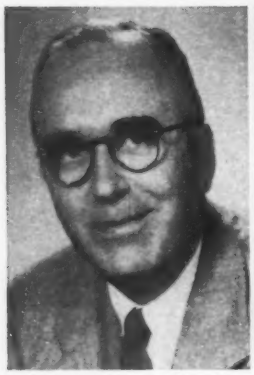

RUSSELL A. SCHLEGEL
Daystrom-Weston gen. mgr.

LORING S. BROCK
U. S. Steel product mgr.

PAUL A. CHRISTENSON
Square D works manager

E. F. ECHOLDS
American Electronics eng.

GEORGE W. WOODSUM
IBM purchasing agent

E. F. MITCHELL
Vitrified Wheel v. p.

as district sales agent. He was with Bethlehem Steel Co.

E. F. Echolds was made chief engineer, electromechanical division, **American Electronics Inc.**, Los Angeles.

George W. Woodsum was made purchasing agent for **International Business Machines Corp.'s** manufacturing plant in Rochester, Minn. **Thomas H. Ferry** was made assistant purchasing agent in charge of contract procurement.

C. E. McCormick fills the new post of manager of engineering design at **Republic Rubber Div.**, Lee Rubber & Tire Corp., Youngstown. Formerly chief engineer, he is succeeded by **Edmund D. Jones.**

R. M. Middleton was made product sales manager of **Westinghouse Electric Corp.'s** standard control division at Beaver, Pa. He succeeds **W. G. Caputo,** named field sales manager for the lighting division in Cleveland.

E. F. Mitchell was appointed vice president and general manager, **Vitrified Wheel Co.**, Westfield, Mass.

Hugh Baumberger was appointed sales manager of **H. M. Keller Co. Inc.**, Burbank, Calif.

James A. Stewart was made manager, plant engineering department, aircraft engine division, **Ford Motor Co.**, at Chicago. He succeeds **E. M. Sirhal,** transferred within the company.

D. L. Bohon was transferred from regional sales manager for the West Coast to the home office sales department of **DeVilbiss Co.**, Toledo, Ohio. He is replaced at Los Angeles by **George W. Fulton.**

Walter Petillon was made assistant western district sales manager, Chicago, for **Buffalo Bolt Co.**, division of Buffalo-Eclipse Corp. **M. M. McCahill** was made sales representative for the Midwest, at Minneapolis.

Russell A. Schlegel was appointed general manager, **Daystrom-Weston Industrial Div.**, Daystrom Inc., at Poughkeepsie, N. Y. This newly formed division will be part of the Daystrom Controlonics Group. Mr. Schlegel was general sales manager of Weston Electrical Instrument Corp., a subsidiary.

Loring S. Brock was made manager of structural and plate products, **United States Steel Corp.**, Pittsburgh, to succeed **Fred H. Lucas,** retired. Mr. Brock was assistant manager.

Paul A. Christenson fills the new post of works manager, industrial controller division, **Square D Co.**, Milwaukee. He continues responsibilities of purchasing, production control, material control. In addition, he will plan and coordinate all manufacturing operations.

OBITUARIES...

David R. Burton, 47, sales manager, Detroit stamping division, **Eaton Mfg. Co.**, died Nov. 17.

David A. Coulter, a consultant, and formerly general sales manager for **Willard Storage Battery Co.**, Cleveland, died Nov. 20.

William E. Offenhammer, 69, vice president, **Niagara Blower Co.**, Buffalo, died Nov. 14.

Gerald Swope, 84, a former president, **General Electric Co.**, died Nov. 20 in New York.

Thomas J. Neilan, 70, president-chairman, **Reliance Steel & Aluminum Co.**, Los Angeles, died Nov. 17.

F. Hughes Moyer, 82, a former president of **Mackintosh-Hemphill Corp.**, died Nov. 19 in Sturgis, Mich.

Henry Kingsbury, 74, former chief engineer, **Hammond Machinery Builders Inc.**, Kalamazoo, Mich., died Oct. 18.

Herman J. Blaser, president and general manager, **Seneca Wire & Mfg. Co.**, Fostoria, Ohio, died Nov. 8.

Norbert G. Thompson, owner, **Thompson Machine Products Co.**, Toledo, Ohio, died Nov. 12.

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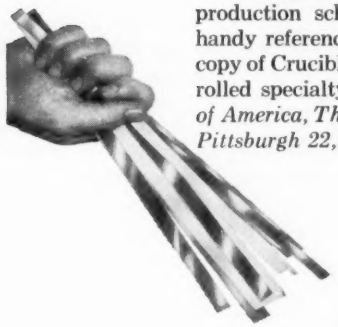

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Carpenter Gets Northeastern Steel

Electric furnace steel mill at Bridgeport, Conn., will be operated as a subsidiary under name of Carpenter Steel of New England Inc. Benefits to steel users cited

CARPENTER STEEL Co., Reading, Pa., officially assumed full ownership on Nov. 19 of the bankrupt Northeastern Steel Corp., Bridgeport, Conn. It will operate the property as a subsidiary under the name of Carpenter Steel of New England Inc.

An order was entered on Oct. 7 by the U. S. District Court in New Haven, Conn., confirming the purchase by Carpenter. The acquisition became final when time for filing an appeal ran out.

"We have been trying since 1940 to expand our capacity fast enough to meet the growing demand for our specialty steels," said Frank R. Palmer, Carpenter's president. "The acquisition of these additional steelmaking facilities will result in a combined annual production capacity of 170,600 ingot tons. This is approximately double our former capacity."

Benefits Users — Delivered cost of the kinds of steel to be produced in Bridgeport will be lower to users in New England and metropolitan New York than those brought in from outside the area, Mr. Palmer pointed out.

A Carpenter task force has reorganized Northeastern's supervisory and salaried personnel and has eliminated the salary cuts instituted by the reorganization trustees who operated the plant under the court's supervision. Hourly paid production employees who were furloughed by the trustees will be recalled as soon as a practical work load is reached.

As soon as production facilities are ready, Carpenter of New England will start making electric furnace quality alloy and stainless steels at the Bridgeport mill, which was rebuilt and modernized in 1955. The old open-hearth furnaces will be dismantled to allow space for future expansion.

The Bridgeport property was known as the American Tube & Stamping plant of the Stanley Works to December, 1954. As of Jan. 1, 1957, the plant had a rated capacity of 188,280 tons of basic open-hearth steel and 114,920 tons of electric furnace steel. Its capacity for rolling hot-rolled products included 166,400 tons of bars (other than concrete reinforcement) and 65,000 tons of blooms and billets for forging or for export. Annual capacities also included 70,000 tons of cold-finished bars and 3600 tons of wire.

Builds New Plating Dept.

A new plating department and waste treatment facilities are being constructed at the plant of Pitney-Bowes Inc., Stamford, Corn. They were designed by Graham, Savage & Associates Inc., Jenkintown, Pa., collaborating with the company's architects, Caproni Associates, New Haven, Conn.

Offers Ultrasonic Units

G. S. Blakeslee & Co., Chicago, builder of industrial washers and degreasing machines, has joined forces with Branson Ultrasonic Corp., Stamford, Conn., to design, sell, and service an advanced line of ultrasonic cleaning machines. Blakeslee is now incorporating Sonogen generators and transducers whenever ultrasonic equipment is required.

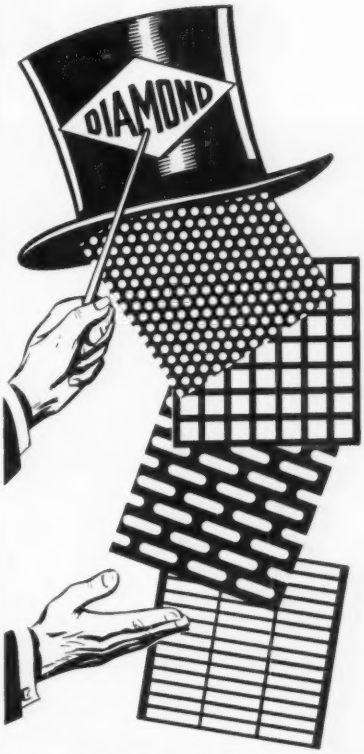
Roper Pump Div. Renamed

Roper Hydraulics Inc., Rockford, Ill., started operation Nov. 1 by taking over the pump business of Geo. D. Roper Corp., Pump Div. Officers are: President, John H. Makemson; vice president, Fred Dickerson; and secretary-treasurer, Charles Oehler.

Gulton Forms New Division

Gulton Industries Inc., Metuchen, N. J., established an Alkaline Battery Div. to produce nickel-cadmium and nickel-iron batteries and associated charging equipment. Simultaneously, the firm has

(*Please turn to Page* 85)



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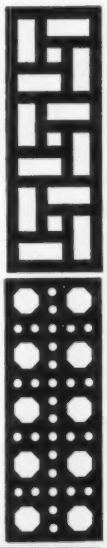

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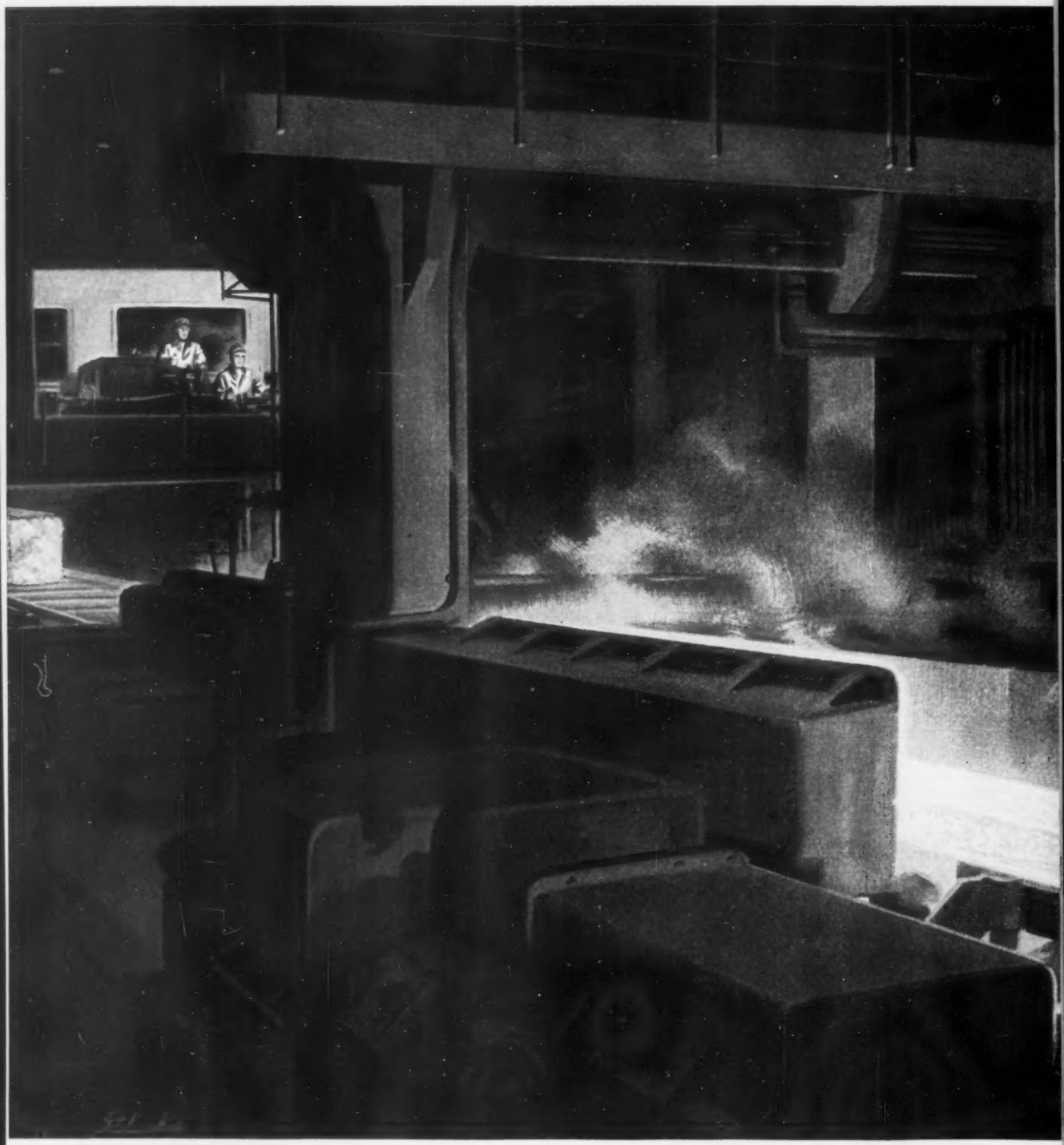
Los Angeles Area

ALLIS-CHALMERS . .



Products for steel: motors, m-g sets, rectifiers, control, pumps, *Texrope* drive equipment, crushers, grinding mills, screens, transformers, unit substations, switchgear, circuit breakers, turbine-generators, voltage regulators, blowers, compressors, condensers, and water conditioning equipment.

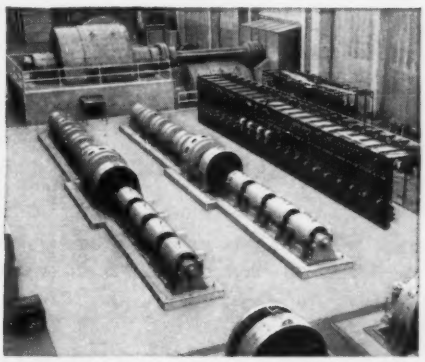
ALLIS-

in Step with STEEL

The blooming mill

Maximum electrical efficiency is assured in blooming mill operations where Allis-Chalmers equipment is used. From switchgear to drive motors, Allis-Chalmers offers a tailored system — engineered by mill experts and designed to keep high quality blooms rolling fast and accurately.

From mine to final processing—Allis-Chalmers equipment is in step with the increasing tempo of expanding steel production. Contact the nearest A-C office in your district, or write Allis-Chalmers, Milwaukee 1, Wisconsin.



Blooming mill motor room view shows components of the Allis-Chalmers electrical package. Switchgear, control, constant and variable voltage motor-generator sets, *Regulex* motor-generator sets, liquid rheostat, and twin drive motors are designed to work together for peak mill output.

Regulex and *Texrope* are Allis-Chalmers trademarks.

CHALMERS

A-C ALLIS-CHALMERS

A-5411

PRODUCTION MACHINERY

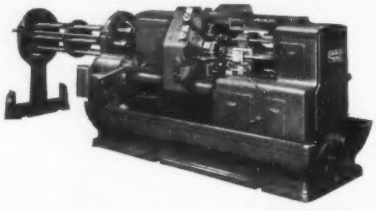
GREENLEE

AUTOMATIC BAR MACHINES

HELP YOU BEAT RISING PRODUCTION COSTS

The cowman achieves speed and power in a good "using" horse by years of careful breeding . . . Greenlee develops these same qualities in its Bar Automatics by continuous research and design improvement. One of the many superiorities of this speed and power is that it enables you to take full advantage of modern tooling practices. Your Greenlee representative will be glad to show you how it is done. Please submit print when inquiring about a specific job.

Write for Catalog No. A-405



SIX AND FOUR-SPINDLE AUTOMATIC BAR MACHINES

GREENLEE Special Machine Tools

- Multiple-Spindle Drilling and Tapping Machines
- Transfer-Type Processing Machines
- Hydro-Borer Precision Boring Machines

GREENLEE
BROS. & CO.

1932 MASON AVE.
ROCKFORD, ILL.

(*Concluded from Page* 81)

been licensed to produce and market alkaline batteries in the U. S. under patent rights held by SAFT Corp. of America. Gulton has taken over the management and operation of SAFT's plant in Lodi, N. J.

Machine Tool Distributor

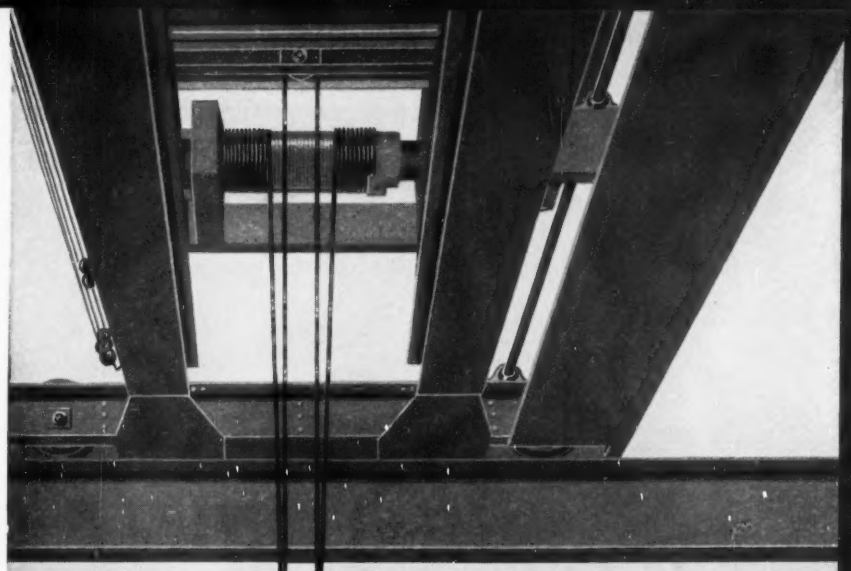
R. E. Duboc Associates has been organized as a machine tool representative and distributor. Headquarters and showroom have been established at 2353 S. Broadway, Denver 10, Colo. The firm will represent in Colorado, Wyoming, New Mexico, and Utah the following: Black & Webster Inc.; Brown & Sharpe Mfg. Co.; Clearing Machine Corp.; Denison Engineering Div., American Brake Shoe Co.; Detroit Broach & Machine Co.; Fosdick Machine Tool Co.; Govro-Nelson Co.; Induction Heating Corp.; R. K. Le Blond Machine Tool Co.; New Britain-Gridley Machine Div., Lucas Machine Div., and Hoern & Dilts Div., New Britain Machine Co.; Sciaky Bros. Inc.; and Vulcan Tool.

Expands Activities Abroad

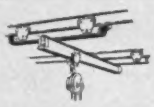
Fluor Corp. Ltd., Los Angeles, established a wholly owned subsidiary, Fluor Engineering & Construction Co., in London, England. This move was made to take advantage of the rapid expansion of the petroleum and petrochemical industries in the sterling areas and Free Europe. Oil companies of the Free World are expected to invest $30 billion outside the U. S. in the next five years, says J. S. Fluor, president.

Massey-Harris Plans Shift

Massey - Harris - Ferguson Inc., Racine, Wis., plans to transfer all manufacturing operations of its tractor plant in Racine to Detroit. The firm is a subsidiary of Massey-Harris-Ferguson Ltd., Toronto, Ont. The Racine plant will be converted to a master replacement part warehouse for North American dealers and users of its farm machinery and tractors. Manufacturing operations in Racine will be terminated June 30. The firm's Detroit plant is undergoing a $4-



CRANE ASSEMBLIES



CHAIN HOISTS AND TROLLEYS

ELECTRIC HOISTS

Conco engineered Cranes rate tops with **plant engineers** — for application engineering that is outstanding, for the service of trained field representatives, for unmatched quality that assures minimum maintenance, reduced accidents, increased output. Conco engineers draw on over 37 years experience to design for the age of automation. Write for bulletin 5000A covering the complete line of Conco cranes, hoists and trolleys.

FROM ANY VIEWPOINT

A FINER CRANE

JIB CRANES

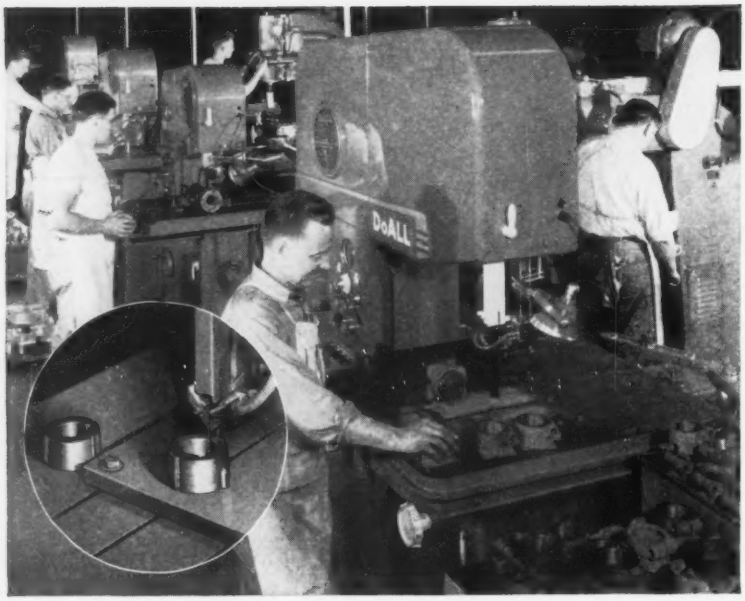
CRANES HOISTS CONCO

HAND GEARED CRANES

CONCO ENGINEERING WORKS

Division of H. D. Conkey & Company 70-14th Ave., Mendota, Illinois

AFFILIATES: Conco Engineering Works–Domestic Heating Equipment • Conco Building Products Inc.,–Brick, Tile, Stone



Parts are slotted faster at lower cost with continuous-cutting DoALL band machines. Note simplicity of fixturing shown in inset.

Shaping the Future with Tools...

Better means for moving people has become a multi-billion dollar problem for metropolitan leaders.

Easing of big city congestion involves everything from trains to traffic lights. Latest device under study to make the city more pleasing to the public is the "conveyor-belt sidewalk". Right now it's being used to channel pedestrian traffic more smoothly onto subway loading platforms.

In the picture above, industry's newest basic machine tool is cutting slots in parts for the moving sidewalk mechanisms. This DoALL band machine does the job in ⅔ the time required by the former method. The parts shown are slotted in 18 seconds, including load and unload time. Saving per year per machine is $7500, nearly 100% annual return on the machine investment.

The future is being shaped by tools like the new DoALL saw.

Conveyor-belt sidewalks, another convenience made possible by modern production tools.

Their ability to increase human productivity and reduce costs will make possible a growing abundance of goods and services to make living more comfortable for everyone.

Manufacturers seeking to give the public more for its money will find more than 1500 cost-cutting tools available through local DoALL stores—machine tools, cutting tools, gaging equipment, tool steel, black granite surface plates and supply items.

Reprints of this series on economics plus "economic kits" available for employee education.

ASK FOR CATALOG describing DoALL band machines for sawing, slicing, filing, grinding or polishing any material from aluminum to titanium, plastics to glass. Call DoALL locally, or write.

The DoALL Company
Des Plaines, Illinois
38 Local Sales-Service Stores E-29

million expansion which will double its size. When completed this month, its capacity will be 250 tractors a day.

Continental Changes Name

Continental Tooling Service Inc., Dayton, Ohio, changed its name to Continental Technical Service Inc. Much of the equipment designed by Continental is produced by the Con-Ray Corp., the firm's electronic and manufacturing division.

Organizes Research Firm

A group of engineers and scientists has organized Larkin Associates Inc., P. O. Box 296, Huntington Station, N. Y. The firm will offer research and development service to the aircraft, missile, plastic, and chemical industries.

Haverly To Move Plant

John Wood Co., Conshohocken, Pa., will move the manufacturing operation of its Haverly Equipment Div. from Syracuse, N. Y., to Royersford, Pa., on Jan. 1. The move will enable Haverly to more than triple production of refrigerated bulk milk coolers.

Dedicates Boron Refinery

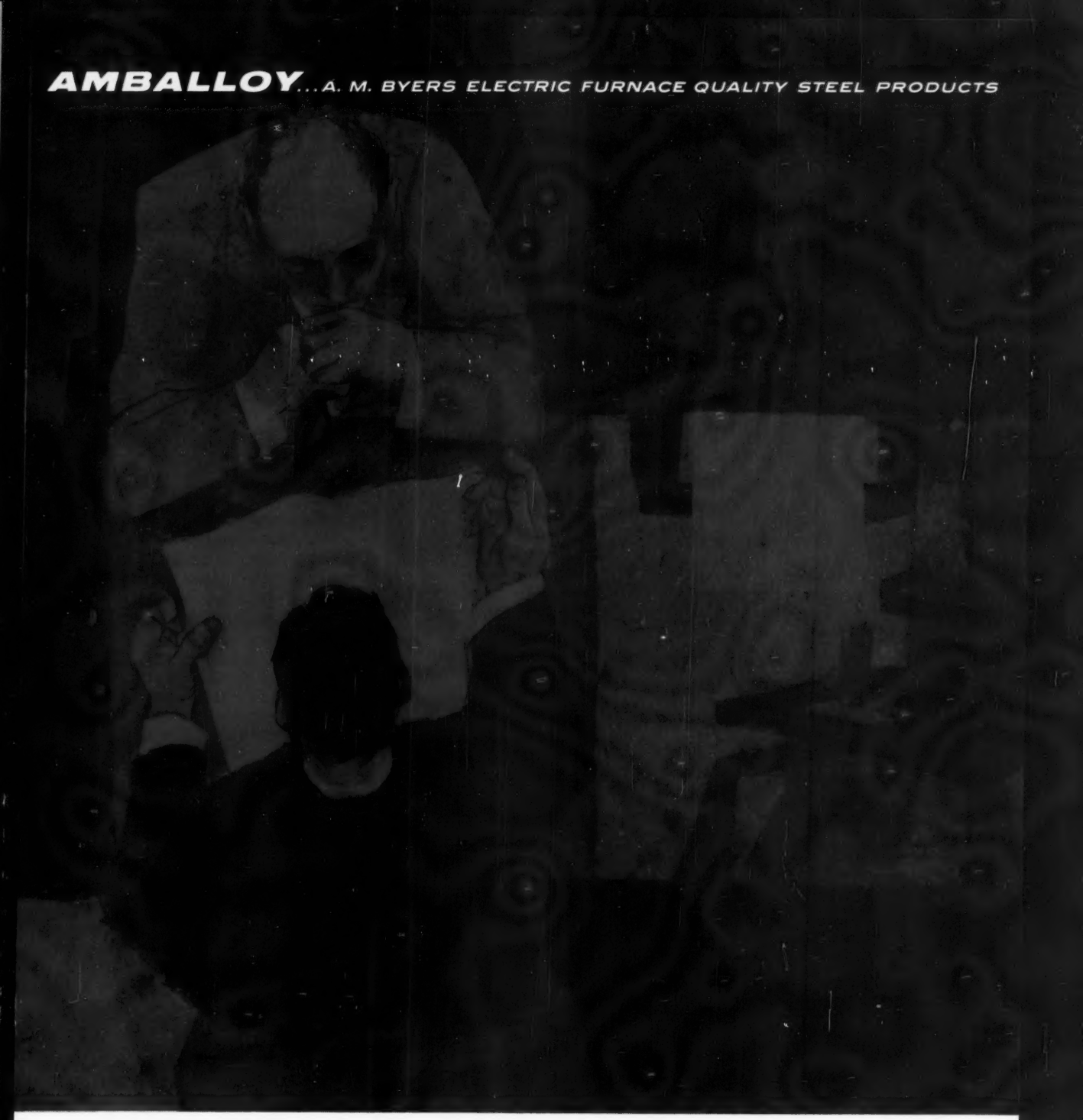
United States Borax & Chemical Corp., Los Angeles. formally opened its $20-million open pit mine and refinery at Boron, Calif. It is expected U. S. production of boron will be increased by 30 per cent through the open pit mining method, which permits almost 100 per cent recovery of ore.

NEW PLANTS

Eutectic Welding Alloys Co. Inc. (Pacific division of Eutectic Welding Alloys Corp., Flushing, N. Y.), opened its new warehouse-service center at 5348 Jillson St., Los Angeles. R. C. Wilcox is in charge.

Barber & Ross Co. opened its new warehouse-store at 2323 Fourth St. N.E., Washington, D. C. In addition to stocks of building supply materials, the company maintains a Structural Steel Div.,

AMBALLOY... A. M. BYERS ELECTRIC FURNACE QUALITY STEEL PRODUCTS



YOU CALL...WE'LL COME WITH TECHNICAL HELP

You name the time, the place and the problem. A Byers metallurgist will be there with technical help. Often, as quick as a phone call.

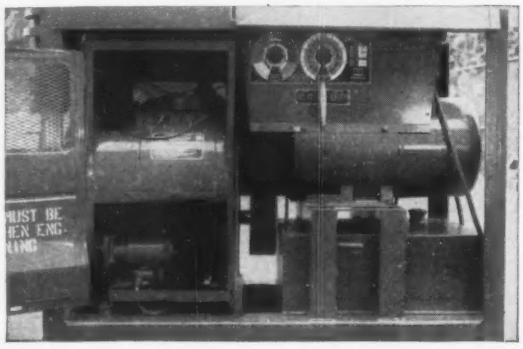
Specialty steels—carbon, alloy and stainless—are areas of the metals business in which our experience could prove invaluable to you. We can work with you to determine which steels are best suited for your requirements. We've made detailed studies of strength, hardness and microstructure of metals. You'll find us adept in many of these skills.

Or maybe you'd like to know something of the men who make our steel? Our facilities? Our tests for quality? Our packaging and loading? The Byers metallurgist has these answers. Ask him to call, soon. A. M. Byers Company, Clark Building, Pittsburgh 22, Pennsylvania.

A growth company with the emphasis on quality and service **A. M. BYERS COMPANY**

"2 KRANE KARs HANDLE ALL OUR MAINTENANCE, REPAIRS, and STORAGE," says CHARLES PRETSCH, Master Mechanic, SLATTERY CONTRACTING CO.
"The KRANE KARs Assemble and Disassemble equipment at Maspeth yards . . . buckets and shovels, tractor treads, graders, bulldozers, crane booms, backhoes, etc. Load and Unload trucks and trailers, recently loaded out 60 tons of wide flanged beams on one job alone. Stack and Store material in yard, and carry parts to shops, positioning them for repairs. We find KRANE KAR more economical for this type of work."
ALL-HYDRAULIC
SILENT HOIST
KRANE KAR
SWING-BOOM MOBILE CRANE
1000 TO 25,000 LBS. CAPACITY
FLUID DRIVE POWER STEERING
ASK FOR BULLETIN NO. 79
Sold and serviced by Responsible, Well-Equipped Distributors throughout the World
SILENT HOIST & CRANE CO.
Pioneer Mfrs. of Heavy Duty Materials-Handling Equipment
849 63rd Street, Brooklyn 20, N. Y.

3,143 operating hours with only minor adjustments with this 400 amp.



WISCONSIN-POWERED WELDER

On-the-job service is what counts most in an engine. Here, for example, is a brief summary of a service report covering the performance of the Model VR4D 56 hp. Wisconsin Heavy-Duty AIR-COOLED Power Unit which drives the 400 Ampere Arc Welder illustrated above:

"Has operated exceedingly well . . . approximately 3143 operating hours . . . maintenance has been negligible after a few minor adjustments; appreciate fact that servicing is so simple; we are free of anti-freeze . . . no fooling with gadgets of water-cooled engines."

This is another typical case of outstanding service delivered by Wisconsin Heavy-Duty Air-Cooled Engines on many kinds of equipment. Basic load-holding High Torque, heavy-duty design and construction in all details, foolproof all-weather Air-Cooling and *exclusive specialization* in the design and manufacture of AIR-COOLED Engines are some of the factors that are responsible for Wisconsin Engine preference wherever dependable, economical power is required.

You can't do better than to specify "Wisconsin Power" for your equipment. Write for Wisconsin Engine Bulletin S-212.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN

A7-6149-⅓A

a Lumber-Millwork Div., and a Prefabricated Homes Div.

Carmody Corp. moved into its $150,000 plant at 2360 Wehrle Dr., Amherst, N. Y. The firm makes training devices for the armed services and industry.

Puerto Rican Can Co., subsidiary of American Can Co., New York, opened its 100,000 sq-ft plant at Bayamon, P. R. The $1-million plant is capable of turning out 150 million containers a year.

NEW ADDRESSES

Wolverine Tube, a division of Calumet & Hecla Inc., moved its administrative and sales offices to a new building at 17200 Southfield Rd., Allen Park, Mich. Plant personnel responsible for Detroit plant purchasing, engineering, production, and related plant operations will remain at the Detroit plant offices on Central Avenue.

Roy Bawden Ltd. moved to 150-154 Bentworth Ave., Toronto, Ont. The new plant more than doubles the company's capacity to produce pumps, converters, tanks, die sets, accessories, and special machinery.

ASSOCIATIONS

Loren Gillhouse, Quincy Compressor Co., Quincy, Ill., was elected president of the **Air Compressor Research Council**, Chicago. He succeeds D. R. B. Robson, Keystone Compressor Co., Philadelphia.

National Electrical Manufacturers Association, New York, elected W. V. O'Brien, Apparatus Sales Div., General Electric Co., Schenectady, N. Y., president. He succeeds A. A. Berard, Mt. Vernon, N. Y., president of Ward Leonard Electric Co.

British Iron & Steel Federation, London, England, appointed Lewis Chapman of William Jessop & Sons Ltd., president-elect to succeed the late Gerald Steel. Sir Andrew McCance, Colvilles Ltd., has been invited to continue as

president of the federation next year.

C. W. Diven Jr. was elected president of the **Steel Club of Philadelphia**, an organization made up of steel sales representatives working in the Greater Philadelphia area. Mr. Diven is district sales manager for Sharon Steel Corp., Sharon, Pa. Other officers are: Vice president, A. W. Taylor, Carpenter Steel Co., Reading, Pa.; and secretary-treasurer, C. W. Test, Youngstown Sheet & Tube Co., Youngstown.

CONSOLIDATIONS

P. R. Mallory & Co. Inc., Indianapolis, acquired plant facilities and majority interest of **Milli-Switch Corp.**, Santa Monica, Calif., maker of electronic switches for missile and rocket parts.

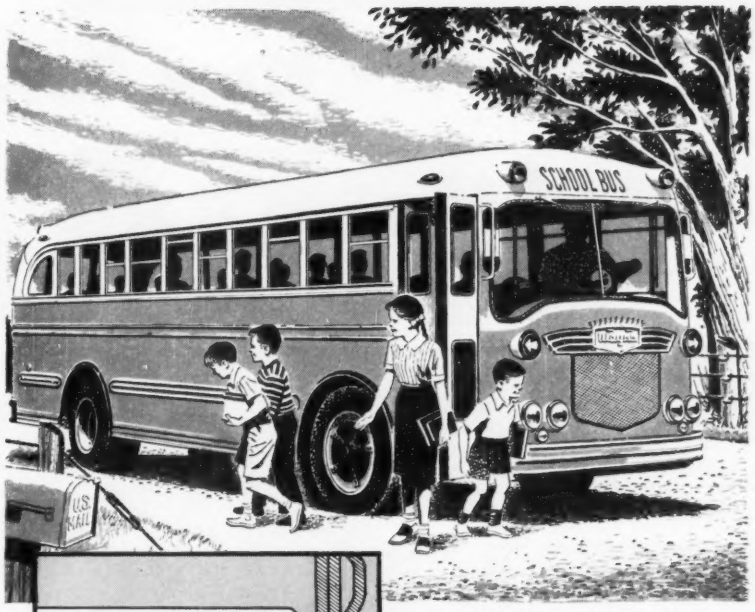
Wisconsin Knife Works, Beloit, Wis., purchased **Bailey & Blendinger Co.**, Union, N. H., from Lodding Engineering Co., Worcester, Mass. The property will be operated as the B & B Knife Div. of Wisconsin Knife Works.

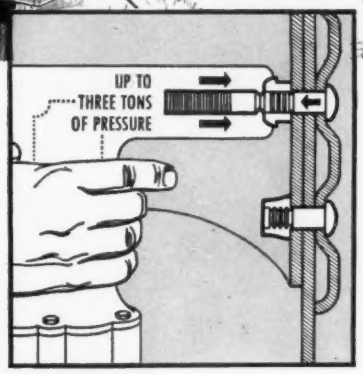
Johnson Bronze Co., New Castle, Pa., purchased **Apex Bronze Foundry Co.**, Oakland, Calif. The new subsidiary will make plain cylindrical, flanged, self - aligning bronze bearings, and miscellaneous bronze castings.

Wapakoneta Machine Co., Wapakoneta, Ohio, manufacturer of machine knives, purchased controlling interest in **California Grinding Works**, Oakland, Calif. Operating as a subsidiary, the west coast firm will specialize in machine knives, press brake dies, and all types of long, flat grinding.

Waukesha Co., Waukesha, Wis., purchased the **Climax Engine & Pump Mfg. Co.**, Clinton, Iowa, manufacturer of internal combustion engines. The Waukesha firm makes heavy duty, diesel, gas, and gasoline engines.

Transcontinental Industries Inc., Detroit, is purchasing **Highway Trailer Co.**, Edgerton, Wis.





Wayne takes the "Wiggle" out of Bus Bodies with Townsend Lockbolts

The world's foremost manufacturer of bus bodies—Wayne Works Division, Divco-Wayne Corporation—stresses strength, safety, and durability in construction.

Elimination of "rivet-wiggle" is one big reason why Wayne bus bodies are stronger. "Rivet-wiggle" and structural weakness occur when rivets fail to draw sheets completely together. Townsend lockbolts* have two qualities that enable Wayne to produce "wiggle-free" bus bodies.

First, these lockbolts produce absolutely uniform draw-down, or clinch, at each fastening because they are applied with an automatic gun that eliminates the element of human production-line error. Second, Townsend lockbolts, designed to lock with up to three tons of evenly distributed pressure, are far stronger than ordinary bolts, rivets, or spot welds.

In addition to uniform high clinch and vibration resistance, Townsend lockbolts offer ease and economy of installation. These are some of the reasons why Wayne has standardized on Townsend lockbolts for all structural fastening.

If you want these advantages in a fastener, a Townsend representative will be glad to demonstrate lockbolts right at your desk. For full information or a demonstration, write to Townsend Company, P. O. Box 237-C, New Brighton, Pa.

The Fastening Authority

Townsend

COMPANY • ESTABLISHED 1816

NEW BRIGHTON, PENNSYLVANIA

Sales Offices in Principal Cities

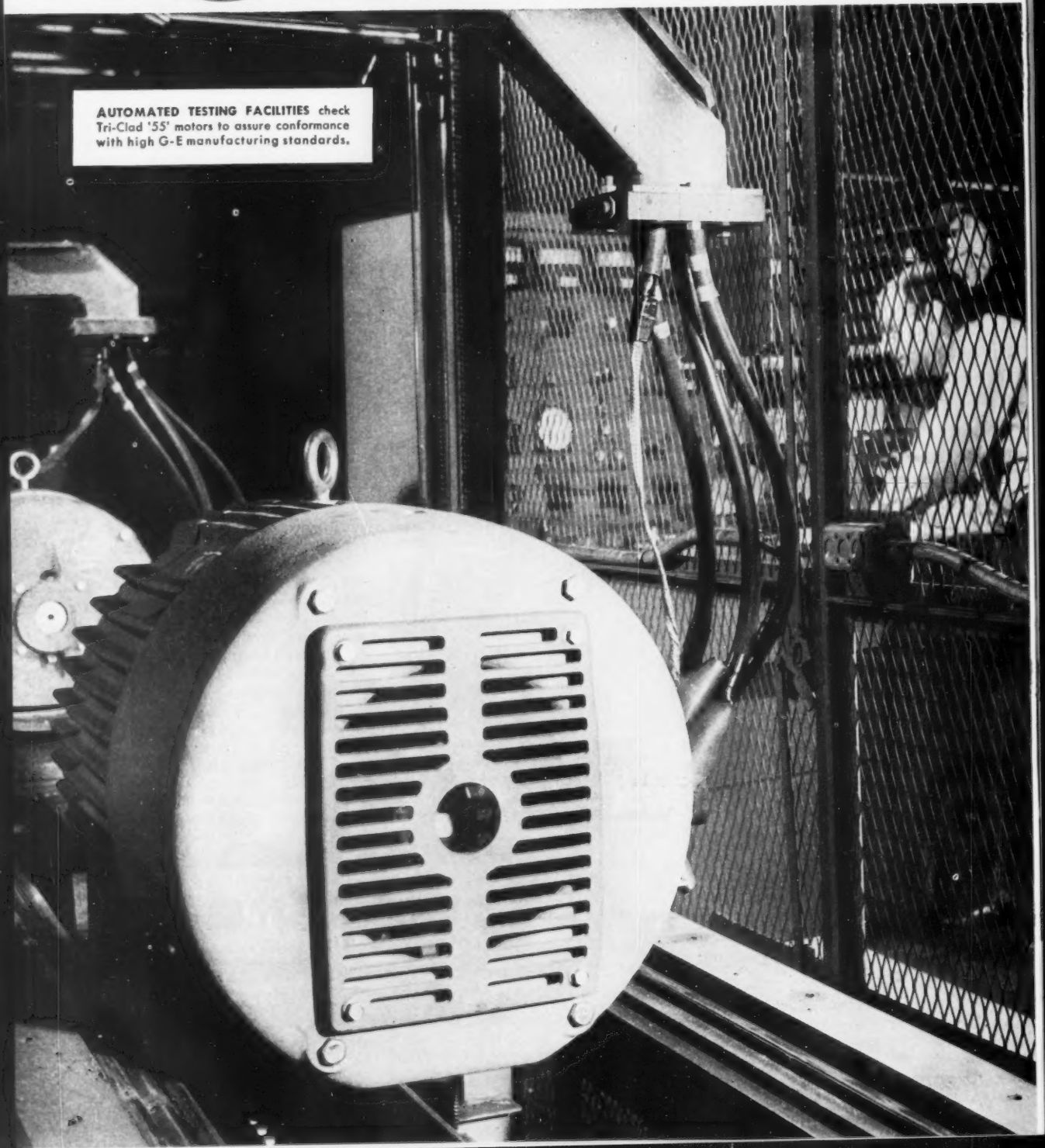
Cherry Rivet Division • Santa Ana, California

*Licensed under Huck patents RE22,792; 2,114,493; 2,525,307; 2,531,048; 2,531,049; and 2,754,703.

compact . . . power packed

New General Electric

GREATER

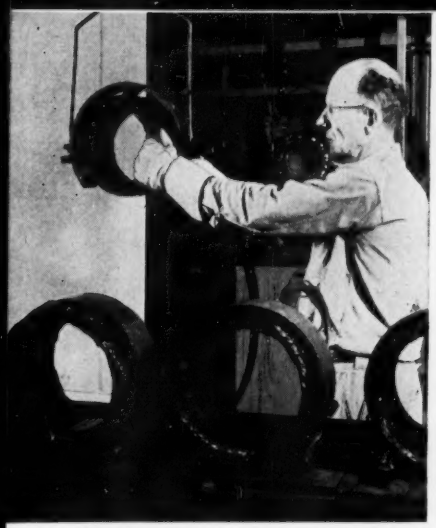


TRI 55 CLAD Motors Offer . . .

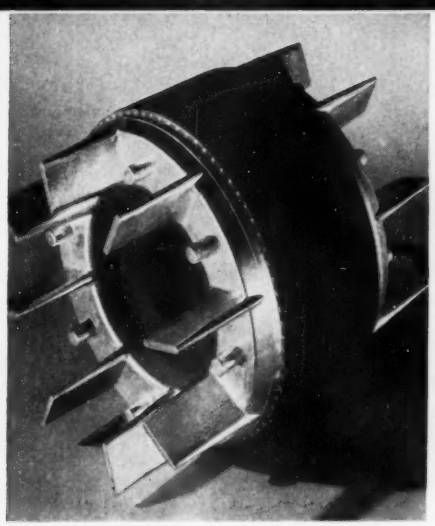
REG. U.S. PAT. OFF.

RELIABILITY

NOW AVAILABLE THROUGH 125-HP



MORE EFFECTIVE INSULATION—New Mylar* polyester film slot and phase insulation gives Tri-Clad '55' stators up to 8 times more protection than conventional types. Formex® wire gives protection against heat aging.



MORE EFFICIENT ROTORS—Revolutionary new double-entrance centrifugal casting technique is utilized on rotors for new larger ratings—up through 125-hp. Solid castings result, helping to prevent localized heating.

MORE FULLY PROTECTED ENCLOSURES—Tri-Clad '55' motor frames and end-shields are cast-iron constructed to provide rigid support and corrosion resistance. Cast-in louvers help protect against contaminant entrance.

immediate shipment . . . all ratings

To cost-conscious motor users, greater equipment reliability means both immediate and long-run cost reductions. In the immediate future, it minimizes profit-robbing downtime and cuts maintenance costs; and, in the long-run, it reduces replacement costs because motors last longer.

Now, to provide increased reliability for motor users, General Electric offers a complete line of Tri-Clad '55' motors—up through 125-hp—designed to new NEMA space and weight-saving dimensions.

QUALITY CONSTRUCTION GIVES GREATER RELIABILITY—New materials and manufacturing techniques—such as those described above—are used in the production of Tri-Clad '55' motors to give added service life, with fewer breakdowns and reduced maintenance.

But, greater reliability is not the whole Tri-Clad '55' motor story. G-E engineers have also designed these new motors to provide easier installation, and reduced shipping, handling and storage costs. And, you can get *immediate* shipment—usually from warehouse stocks—of any popular Tri-Clad '55' motor rating, up through 125-hp.

FOR COMPLETE INFORMATION on the new line of Tri-Clad '55' motors, contact your nearby G-E Apparatus Sales Office or Distributor. Send in the attached coupon for free Tri-Clad '55' motor bulletins.

*Reg. DuPont Co. Trademark

Section D891-9
GENERAL ELECTRIC COMPANY
Schenectady 5, New York

Please send me the following publications:

☐ **FREE BULLETIN (GEA-6602) describes advanced features of new Tri-Clad '55' motors through 125-hp.**
☐ **FREE SLIDE RULE (GEN-148) to determine weight and space-saving benefits of new Tri-Clad '55' motors.**

NAME.....

TITLE.....

COMPANY.....

ADDRESS.....

CITY & STATE.....

Progress Is Our Most Important Product

GENERAL ELECTRIC

HIGH FLYING
FORGINGS
KEY TO FORGINGS SHOWN:
1. Missile Ring Splice... Aluminum – 54 lbs. 20 inches
2. Missile Rib... Titanium – 95 lbs. 98.50 inches
3. Missile Fin ... Aluminum 8 lbs. 30 inches
4. Accumulator... Aluminum – 282 lbs. 30 inches
5. Spar Fin... Aluminum – 65 lbs. 59 inches
1
2
3
4
5
In the Jet — Missile — Rocket Age, dependable forgings by Wyman-Gordon are meeting the challenge of progress. Whether for Defense or in the interest of Satellite Science, there is no substitute for Wyman-Gordon quality, experience and know-how.
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Established 1883
FORGINGS OF ALUMINUM • MAGNESIUM • STEEL • TITANIUM
WORCESTER 1, MASSACHUSETTS
HARVEY, ILLINOIS • DETROIT, MICHIGAN

STEEL

December 2, 1957

Technical Outlook

SHOP-SIZED NUMERICAL CONTROL—Electronic machine control is within the reach of the small shop. A numerical control system introduced by Electronic Control Systems Inc., Los Angeles, can be adapted to automatic positioning in drilling, spotwelding, riveting, tapping, countersinking, and template plotting. Called the Digimatic Model C-202 Point Positioner, the system includes a punched tape preparation unit, a tape reader and control unit, and a compound servopositioning table.

NEW STAINLESS USE—Sonotone Corp., Elmsford, N. Y., will use over 30 tons of Republic's Type 302 sheets this year in corrosion resistant cases for jet aircraft storage batteries.

EDGE MEASURE—A British gage measures infrared radiation from the edges of hot strip to calculate its width while passing through the mill. Accuracy is plus or minus 1/16 in.; delay time for readout is 0.15 second.

HEATS WITH LIQUID GLASS—A new furnace, designed to heat ingots for extrusion, uses liquid glass in a revolving chamber as the heating medium. Marketed by the Bal-Tate Furnace Co., Detroit, the unit was developed in Italy.

BREAKING TRADITION—A survival rifle weighing only 38 ounces has an aluminum alloy barrel with stainless steel liner. It also has an aluminum and stainless action. Armalite Div. of Fairchild Engine & Airplane Corp., Hagerstown, Md., developed it. Another tradition breaker: A chassisless bus with monocoque aluminum body, developed by Henschel und Sohne of Kassel, Germany.

COLUMBIUM ALLOYS—Du Pont's Pigments Dept. has developed a system of columbium alloys and has started a joint program with Thompson Products Inc., Cleveland, to develop fabricating techniques to use the metal in jet engines, missiles, and atomic reactor parts. Du Pont metallurgists say that if columbium is kept reasonably free of gases (nitrogen, hydrogen, or oxygen) its workability is good.

MOLYBDENUM COATINGS—A process for coating metals such as stainless, Inconel, and Croloy with molybdenum has these basic steps: 1. Preparing a dispersion of finely divided moly in a nonaqueous solvent, such as isopropanol. 2. Electrophoretic depositing on the base which is made an electrode in the dispersion. 3. Densifying to achieve close packing of the metal particles. 4. Sintering in a reducing atmosphere to coalesce the particles into a coherent film. The process, developed by Vitro Corp. of America, New York, also offers a new approach in applying lubricating films, corrosion resistant and special ceramic coatings.

IMPROVED ALUMINUM CONDUCTORS—Reynolds Metals Co., Louisville, is silver plating aluminum bus conductors to simplify soldered, brazed, and bolted connections. A new manufacturing process allows the company to sell the conductors for less than equivalent copper bus.

AUTOMATES RESISTANCE WELDER—Newest contribution to Detroit automation is a flash welder which joins worm gears to steering shafts. Built by Federal Machine & Welder Co., Warren, Ohio, it automatically marks the correct shaft and radial positioner for the worm.

TRANSPARENT VCI FILM—A new transparent film, treated with volatile corrosion inhibitor, heat seals at 200° F. Called MY-V-1 (it's based on Mylar), the packaging material offers greater product sales appeal and allows ready examination. Daubert Chemical Co., Chicago, says the film can be used to protect iron, steel, and aluminum products, and provides rust prevention for several years.

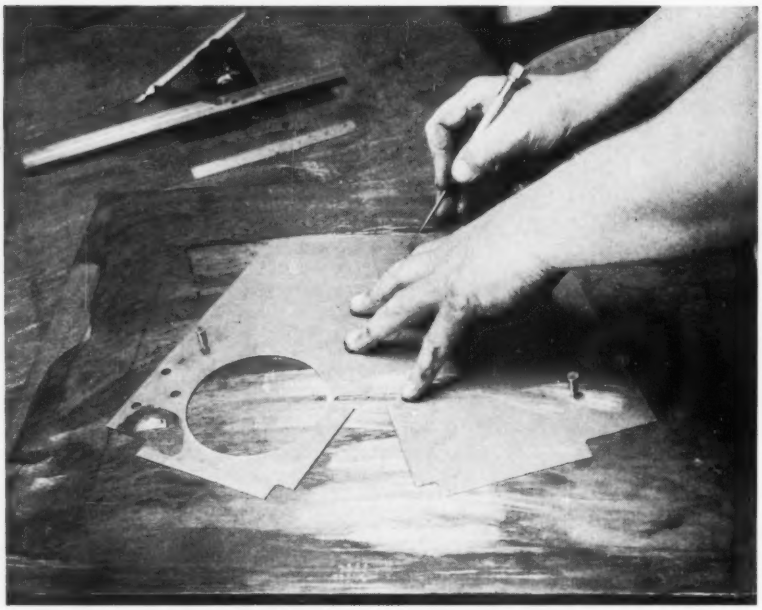
Metalworking Outlook—Page 47

Market Outlook—Page 135

How a Short Run Die Is Made

It Costs . . .

Material	$ 64
Labor (63 hr)	$416
Total	$480



1. Scribe to template.

Short Run Dies Offer Long Life

They add a new dimension to the thinking of shopmen under pressure to use shortcuts. The information in this article will give you an idea of how they fit into your operation

THE TYPE of die illustrated is being used as a double edged competitive weapon by alert stampers. It combines long tool life and tool economy.

The cost of the example is less than one-fourth that of a permanent tool. (It's made by Scottish Tool, Die & Metal Products Co., Cleveland.) With resharpening, it will produce several hundred thousand blanks made from 0.001 to 0.187 in. mild steel.

Problem—Die designers and shop foremen are under constant pressure from management to make use of more shortcuts like the steel rule die (STEEL, July 22, p. 100). Makers of short run dies have come up with many improvements. A few of their dies are the equivalent of a permanent tool on some jobs.

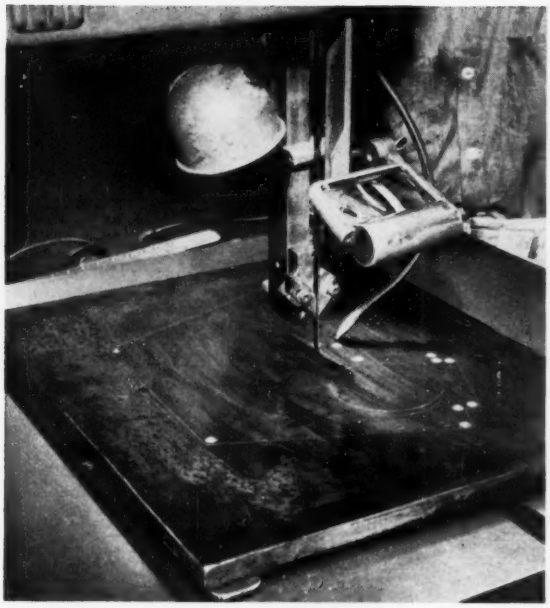
Formula — Johan M. Andersen, Duplicon Co. Inc., Westboro, Mass., heads one of the thirty-odd firms which specialize in short run dies. A member of the Small Lot Stamping Institute (write HPL Mfg. Co., 15210 Miles Ave., Cleveland, Ohio), he uses a rule of thumb to choose between the standard short run and the steel rule types:

- Standard short run tooling is more economical: 1. When the blank is smaller than 12 in. square and 0.005 to 0.375 in. thick. 2. When tolerances are less than 0.015 in.
- Steel rule dies are more economical: 1. When the blank is larger than 12 in. square (the larger it is, the greater the advantage). 2. When material thickness is less than 0.125 in. (That figure will probably be increased, says Mr. Andersen.) 3. When tolerances are not tighter than 0.030 in.

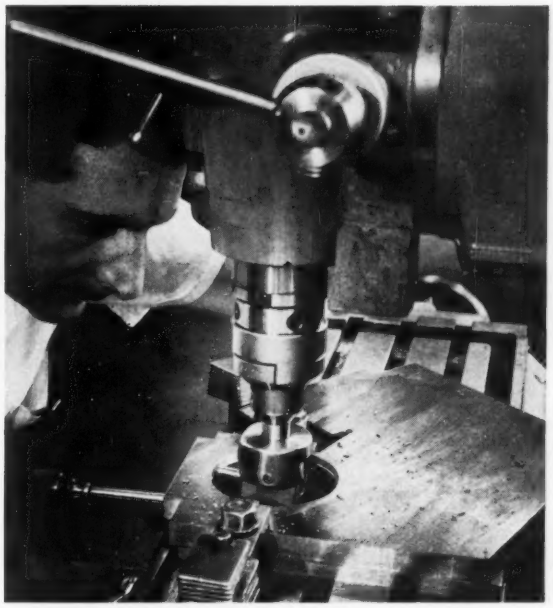
"In general, the steel rule die is another tool in the short run diemakers' bag of tricks. It shouldn't replace standard types any more than ceramic cutting tools should obsolete carbides," thinks Mr. Andersen.

Another Avenue—The tool shown in the illustrations at the beginning of this article demonstrates another approach to longer die life. The Scottish Company feels that such dies are the equal of permanent tools on many blanking and piercing jobs. Some have already run more than a million pieces.

The material is a 4130 or 4140 steel plate. Holes are drilled to



2. Drill and cut out on bandsaw.



3. Mill and finish file to size.

4. Flame harden cutting edges to Rc 55.

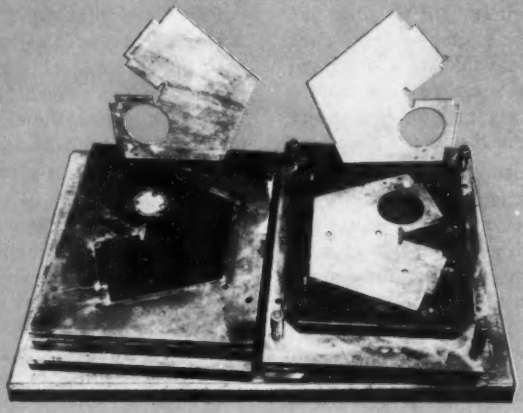
5. Broach female with punch; finish to size.

within plus or minus 0.005 in.; blank dimensions are held within plus or minus 0.010 in. Cutting edges are flame hardened to Rockwell 53-55.

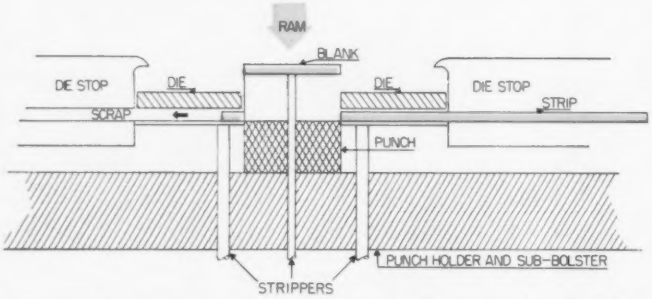
After the punch plate is scribed, clearance holes are drilled and the shape cut with a bandsaw. The shape is finished by milling and hand filing.

The female die is laid out, clearance holes are drilled and the shape bandsawed.

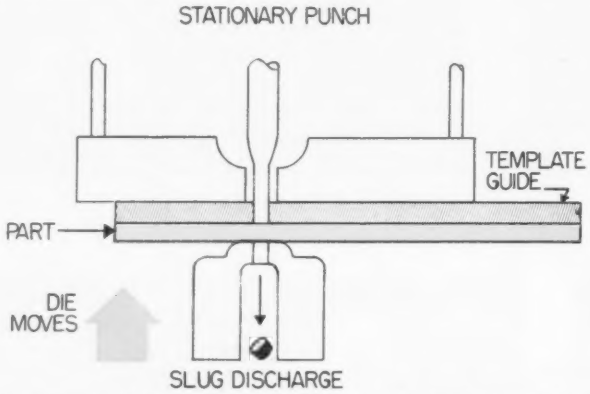
Shortcut — The punch is flame hardened and matched with the female. Both are placed in a hydraulic press. It forces the punch through the female, broaching it to size. The female is then milled



6. Here's the assembled die with strippers and guides.



Here are the basic parts of Dayton Rogers' blanking die. Punch is stationary. Ram contacts female forcing it against punch. Strippers are operated by pneumatic die cushion



Dayton Rogers hole punchers operate from the bottom up. Magnetism holds template and part (top). Ram moves female die up. Punches come in sizes up to 1.5 in.

and smoothed by hand filing.

Following flame hardening of the female, the die is ready for assembly. Clearances are checked, and guides are drilled and reamed. Stripper plate and springs are attached, and the die is checked in a tryout press.

Mounting holes in all dies are drilled to fit a preset pattern. Dies are interchangeable on a standard die set. The same pattern can be drilled in upper and lower bolsters and the die used without shoes.

Added Feature—Leo Ward, president of Scottish, developed a flame hardening torch for his shop. It's a standard oxyacetylene torch with a built-in water spray and guard. The torch heats the cutting edge of the die. As it moves along, the spray (separated from the hot tip by the guard) quenches the heated section, imparting exceptional hardness (Rc 55) to the metal.

The exceptionally tough, shock resistant alloys increase die life.

Another Avenue—Here's a die method based on the idea that the fastest way isn't always the cheapest. It was recently introduced by Dayton Rogers Mfg. Co., Minneapolis.

Parts are blanked first. Holes are punched one at a time on separate punch presses. Die costs are said to be less than 20 per cent of those for conventional dies. The method is ideal when only a few thousand pieces a year are required.

Blanking—The company recommends an open bed inclinable press for its blanking die, which consists of a punch holder and sub-bolster. A pneumatic die cushion is used for stripper pins and blank ejector.

The female die is held loosely over the stationary punch in a die stop which replaces the upper bolster in conventional dies. The die stop and sub-bolster are tied together.

Strip stock is fed through the blanking die against an adjustable stop. When the press is tripped, the ram block forces the female against the strip and punch. On the upstroke, the pneumatic stripper forces the stripping plate against the strip, removing it from the punch. A longer stripper in the center holds the completed blank against the ram until it clears the female.

Cycling—A full universal material stop picks up the blanked position in the scrap strip. The press then cycles for another blank. Maximum speed is 100 to 250 parts a minute.

Piercing—Holes are pierced one at a time. Small presses can be arranged in a semicircle around the operator.

Dayton Rogers presses hold interchangeable round punches and dies which progress from the smallest size to 1.5 in. in steps of 0.0005 in.

A piece of scrap fastened to the upper part of the press serves to locate the blank correctly for piercing. Tripping the work cycle magnetizes a stripping plate. The combination of magnetism and a mechanical stripper pulls the blank off the piercing punch. The magnet also holds both piercing fixture and part during the work cycle.

The press is automatic. As the work reaches the correct position, the trip operates. Prevention against double cycling is built into the electrical system.

Summation — H. A. Daschner, managing director, Pressed Metal Institute, Cleveland, echoes the sentiments of small lot diemen: "Such dies are adequate for more jobs than formerly thought possible. Frequently, the cost of several is less than that of one permanent tool."

You can choose from an increasingly wide variety: Plug, sandwich, mugget, put and take, steel rule, and the types described in this article. Some manufacturers (like Dayton Rogers) offer presses designed only for short runs.

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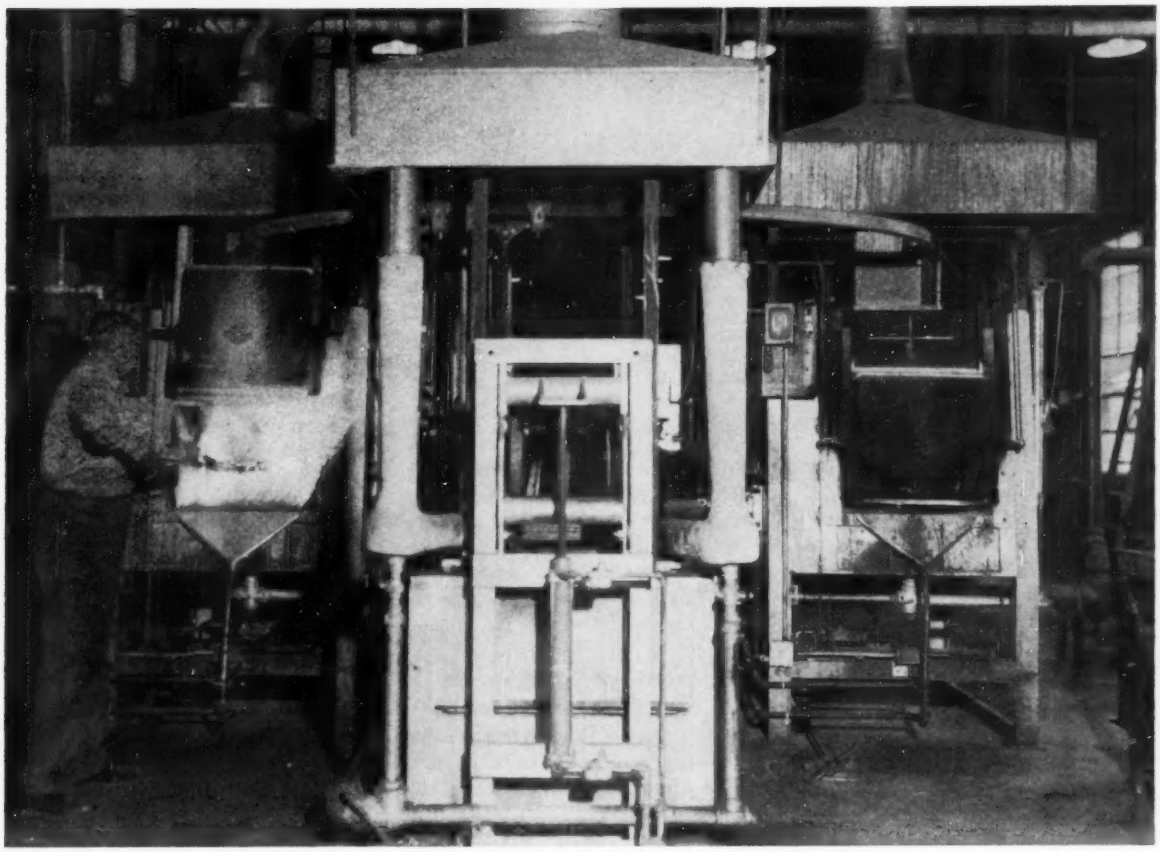


Operator loads tray of parts. Controlled atmosphere furnaces are placed at each side of martempering bath (foreground). Monorail connects furnaces with quenching bath

Modified Martemp Cuts Warping

The system also permits a better structure stabilization during deepfreezing, reduces stock allowance for grinding, and cuts rejects to 1 per cent, says maker of aircraft pumps

By EDGAR C. WALLACE,
Chief Metallurgist
and HOWARD E. CROUSE,
Supervisor
Watertown Div.,
New York Air Brake Co.,
Watertown, N. Y.

MODIFIED martempering is a good way to heat treat intricate and expensive parts.

Its advantages over conventional methods: It costs less to operate, reduces grinding costs, lowers rejects due to grinding cracks, and improves tolerances on finished parts.

Example—The Watertown, N. Y., division of New York Air Brake Co. produces air brake equipment and aircraft hydraulic pumps. It previously heat treated pump cylinder blocks in salt or in atmosphere furnaces with a conventional oil quench.

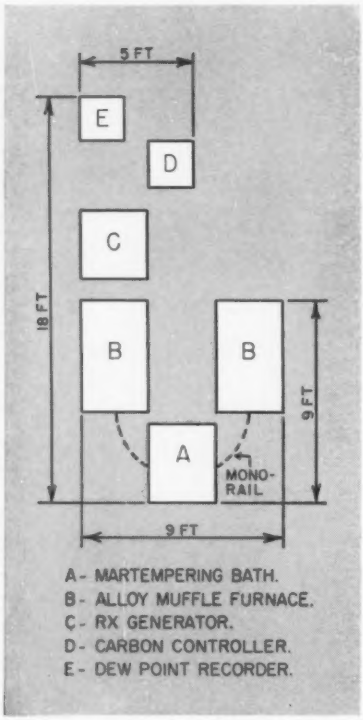
Pump blocks are normally made from 52100 steel, oil hardening tool steel, or one of several stainless grades.

The blocks are 2 to 5½ in. in diameter (some experimental models are larger). Each contains 30 to 100 drilled holes. Hole sizes are 1/32 to 1 in. They often have a center boring 4 in. in diameter.

Problems—Warpage was excessive. Grinding cracks caused a high percentage of rejections. After grinding to a millionth of an inch, final size was not stable.

Switching to controlled atmosphere furnaces and martempering at 260 to 275° F, eliminated most of the difficulties.

Equipment—The setup uses a martempering bath; two horizontal, controlled atmosphere furnaces



Equipment takes floor area of less than 9 by 18 ft. Layout permits one man to heat treat 400 lb an hour. Carbon potential is easily adjusted at generator

with alloy muffles; an RX gas generator; an Autocarb signaling controller; and an Autocarb dew point recorder. The equipment was installed by Surface Combustion Corp., Toledo, Ohio.

Floor Space—Heating furnaces have 18 by 30 in. nickel-chromium alloy muffles, placed behind and at either side of the martempering bath (see illustration at left). They are heated with over-and-under multiple burners that are piloted. A small monorail, leading to each furnace door, passes over the center of the martempering bath.

The bath is 30 in. deep, 36 in. wide, and 40 in. long. It is heated by two suction immersion burners. They can also cool to prevent overheating of the bath. A variable speed agitator circulates the oil.

Procedure—Parts are tray loaded and put in the furnace. Heating time varies with cross section and load—it averages 1¼ hours.

After heating, the operator opens the door and puts the tray on a table above the bath. The table is on an air piston controlled by a foot pedal. Parts are lowered rapidly into the marquenching oil.

The parts reach bath temperature in about 5 minutes and are removed in 10. Short immersion prevents excessive stabilization of retained austenite.

Stabilizing — After cooling to room temperature, parts get a series of tempering and deepfreeze treatments to complete austenite transformation.

As-hardened, parts are 64 to 65 Rockwell C. Work is usually tempered to below the as-quenched hardness. New York Air Brake feels that freezing is good insurance for maintaining tolerances which prolong service life. (Pumps often work at 4500 psi. Tolerances are held to a millionth of an inch.)

Atmosphere—Treated parts cost $25 to $500. Spoilage from surface changes is expensive.

An 800 cfh, RX generator is used to manufacture protective atmospheres. A signaling carbon controller controls the dew point, and a two-point recorder charts the dew points of the two furnaces. Dew points of 30° F and up are used.

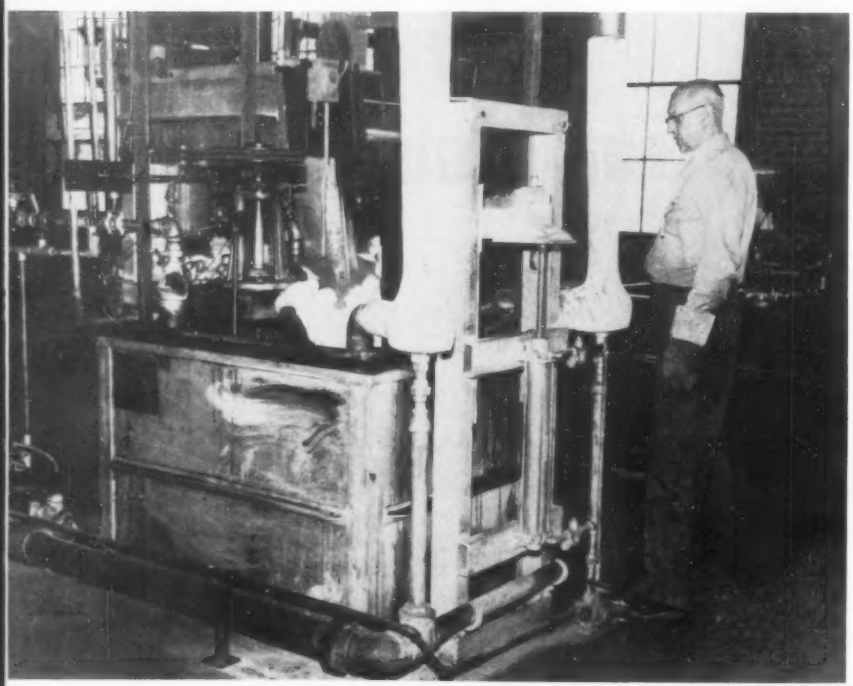
Natural gas is added to raise carbon potential since the company prefers a slight carburization for small parts.

Flexibility—A valve system in the atmosphere generating equipment improves control. RX generator gas is piped directly to the furnaces, and passes to the two-point recording instrument.

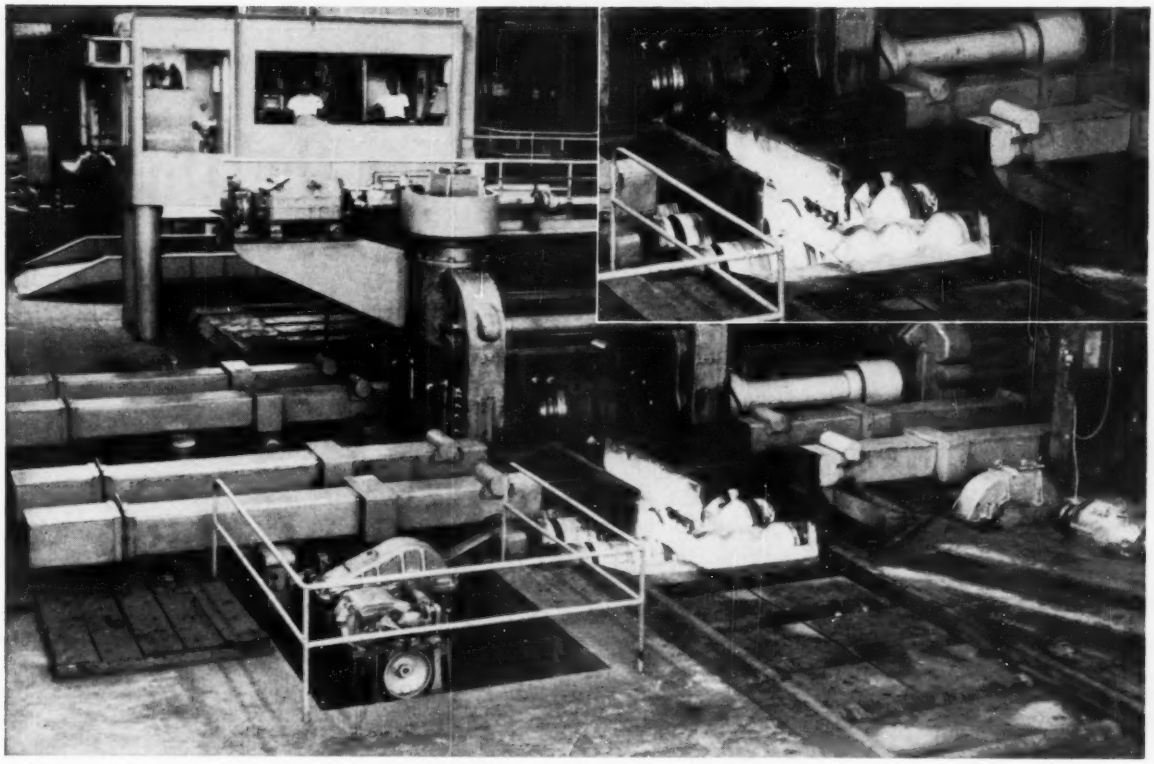
During quenching, the gas from the furnaces doesn't go through the recording equipment. (The operation is automatic.) During the loading and subsequent purging, time clocks control valves automatically. Purging of the furnace is completed before atmosphere again enters the recording equipment.

Atmosphere can be varied in each furnace. Each is manifolded and controlled from the same generator.

Summing Up—New York Air Brake finds that the system greatly increases oil life. Grinding stock has been reduced due to better warpage control. Rejects have been cut from 6 per cent to less than 1 per cent. Cleaning problems also have been eliminated, improving housekeeping.



Operator steps on pedal which controls air lift for trays. In burner exhaust stacks, blowers provide a venturi action which aids combustion and provides cooling when needed



This cogging mill will be used in large scale production of superalloy and high speed steels. It uses diamond grooved rolls

New Mill Will Roll Tough Steels

Latrobe has $3-million mill to roll superalloys and high speed steels. "It'll solve crucial problems in coming missile era," predicts J. E. Workman, executive vice president

A 32-IN. COGGING mill has replaced hammer and press forging for superalloys and high speed steels at Latrobe Steel Co., Latrobe, Pa.

A common blooming mill can't roll these alloys without damage to their metallurgical structure, expains Dr. S. G. Fletcher, Latrobe's vice president-metallurgy.

"The most important departure from tradition which makes it possible for our mill to handle these tough ingots is the use of diamond grooved rolls instead of the usual box or flat rolls of the conventional blooming mill," he added.

Difference—This type of rolling action tends to distribute the hot deformation more uniformly, particularly in the center of the ingot. It gives the kneading required to compact and refine the internal porous cast structure.

Standard box passes on conventional mills will often rupture the centers because of unrestricted lateral flow. On soft steels, lateral flow is not harmful because they have the ductility to absorb the action. Harder alloys tend to break up internally.

Latrobe says that kneading action produced by its type of rolling has beneficial effects on the internal structure—in many cases, the technique is superior to hammering or pressing.

Alloys Vary—Some tough steels are easier to handle than others. Heavy reductions at low speeds are best for some, while others require light reductions at relatively high speed. (Reductions are 2 to 8 per cent per pass—a great deal lower than what is possible with carbon steels.) To take care of this, a great deal of versatility was designed into the mill. Variations in speed of rolling and rate of reduction can be accurately controlled at the pulpit.

The mill can handle ingots as large as 18 in. square that weigh 4000 lb. It will turn out billets as small as 3 in. square, or slabs up to 12 in. wide. One product, termed sheet-bars, consists of slabs 8 to 10 in. wide, about 1½ in. thick. They are used as starting stock for rolling superalloy sheets.

Six men operate the mill. Rolling is controlled from an air con-

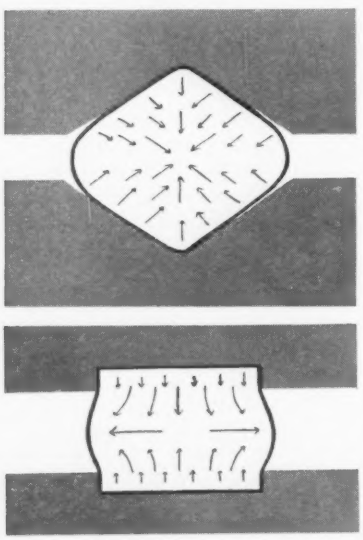
ditioned pulpit. The installation can roll 100 to 150 tons of tough alloys in an 8-hour shift.

Products — A number of steels and superalloys have already been rolled on the mill. It has handled ingots of the common high speed tool steels, such as 18-4-1, M-2, M-3, T-15, including their sulfurized modifications. High carbon, high chromium die steels, some with as much as 2.5 per cent carbon have been rolled. The mill has processed vacuum melted, nickel base superalloys, such as Waspaloy, M-252 and Udimet 500, for jet engines and missiles.

Latrobe is operating a vacuum, consumable electrode furnace and is processing a wide variety of alloys supplied by companies operating induction vacuum furnaces.

Studies on rolling tool steels started almost ten years ago as part of a planned program "to find a better way of handling high speed steels and superalloys," as company officials put it.

Future—The mill brightens prospects for a much broader product line, especially for materials with structural applications in missiles and aircraft. Mr. Workman predicts: "Five years from now, 50 per cent of our business may be in materials we aren't even making now."



The diamond groove rolls (top) give more uniform deformation (especially in center of the ingot), contrasted with pressure from conventional flat rolls, illustrated in bottom drawing

Lockheed Tries the Unusual

Five still-uncommon production techniques are used to build supersonic F-104A Starfighter. They help cut assembly time to that of a trainer that's been in production eight years

STRIVING FOR producibility, engineers at Lockheed Aircraft Corp., Burbank, Calif., designed their sleek F-104A to take advantage of several unusual, but profitable, production techniques.

Five stand out: Compression forming, zero-draft forgings, chemical milling, steel extrusions, and extruded, integrally stiffened aluminum panels.

Here is a Lockheed report on what's being done with these methods.

Compression Forming — Developed by Lockheed engineers, it achieves tolerances unusual in sheet metal parts.

The part first is formed to broad tolerances on a Hydropress. Next it's heat treated and placed in the cavity of a compression die. A high-pressure ram compresses both the surface and edges of the part—forcing metal to flow against the face of the die.

Finished by this method, the sheet metal part is three times as precise as those produced by standard forming. In addition, much sharper flange radiuses can be produced in a channel section. This enables flange rivets to be placed closer to the web of the channel, reducing the thickness required in the web to carry a given load.

Where loads are light, wing spars and ribs in the F-104A are being made from sheet metal, using the compression forming method. Forgings are used in heavy load carrying areas.

Zero-Draft Forgings — Until recently, forgings were made with a taper in the ribs so the forging could be withdrawn from the die cavity. In most forgings, this taper had to be machined off to permit attachment to other parts or, simply, to remove the unneeded material.

Using higher forging pressures and precision dies, forgings are being made to close tolerances with thin, untapered ribs. This eliminites most of the previously required machining operations and is about 20 per cent less costly than a conventional machined forging.

The F-104A uses about 40 zero-draft forgings.

Chemical Milling—Recently the aircraft industry has been removing unneeded material by immersing aluminum sheets and plates in a caustic soda solution. By masking certain areas to prevent etching, lands or plateaus of varying heights can be produced. This process, similar to that used in making photographic plates for printing, cuts machining costs considerably.

The F-104A engine air intake ducts are exclusively chemical milled.

Steel Extrusions—Prior to this development, complex steel shapes had to be machined from solid bars. The F-104A uses approximately a dozen steel extrusions in such applications as piano-type hinges for attaching ailerons to the wing.

Extruded Aluminum Panels—To produce lighter, more efficient and smoother surfaces for engine air intake ducts on the F-104A, Lockheed uses extruded, integrally stiffened aluminum panels this way: The extrusion, in tubular form, is slit lengthwise and unwrapped into a flat sheet. This sheet is then contoured into desired shape through the stretch-forming process.

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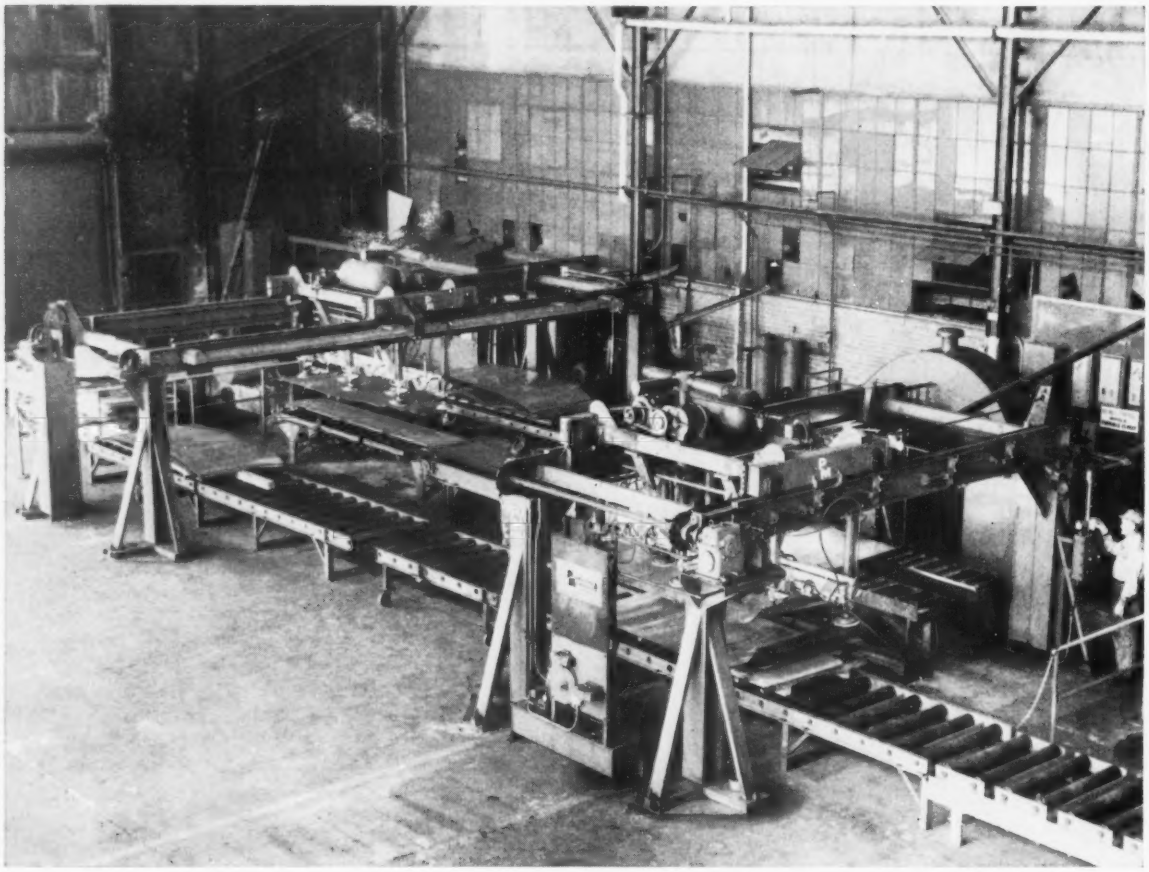


Vacuum crane in foreground has just lifted a sheet from pile. Crane will traverse to next roller conveyor which is entry end of Sendzimir. Crane in background picks them up on exit side

Vacuum Crane Speeds Mill Output

Manual sheet handling took longer, produced too many rejects. This automatic device lifts stainless sheets vertically to avoid scratches. Operator controls cycling time

FEEDING a Sendzimir finishing mill is made easier with vacuum handling equipment, says Atlas Steels Ltd., Welland, Ont.

A new vacuum crane automatically handles the firm's stainless sheets, replacing a manual operation. Output has been increased through the elimination of downtime for rest periods. Quality is better. (There are no scratches caused by dragging one sheet over another.)

Operation—The mill finishes austenitic stainless sheets. Sizes are 25 by 72 in. to 50 by 156 in., gages 0.020 in. to 0.188 in.

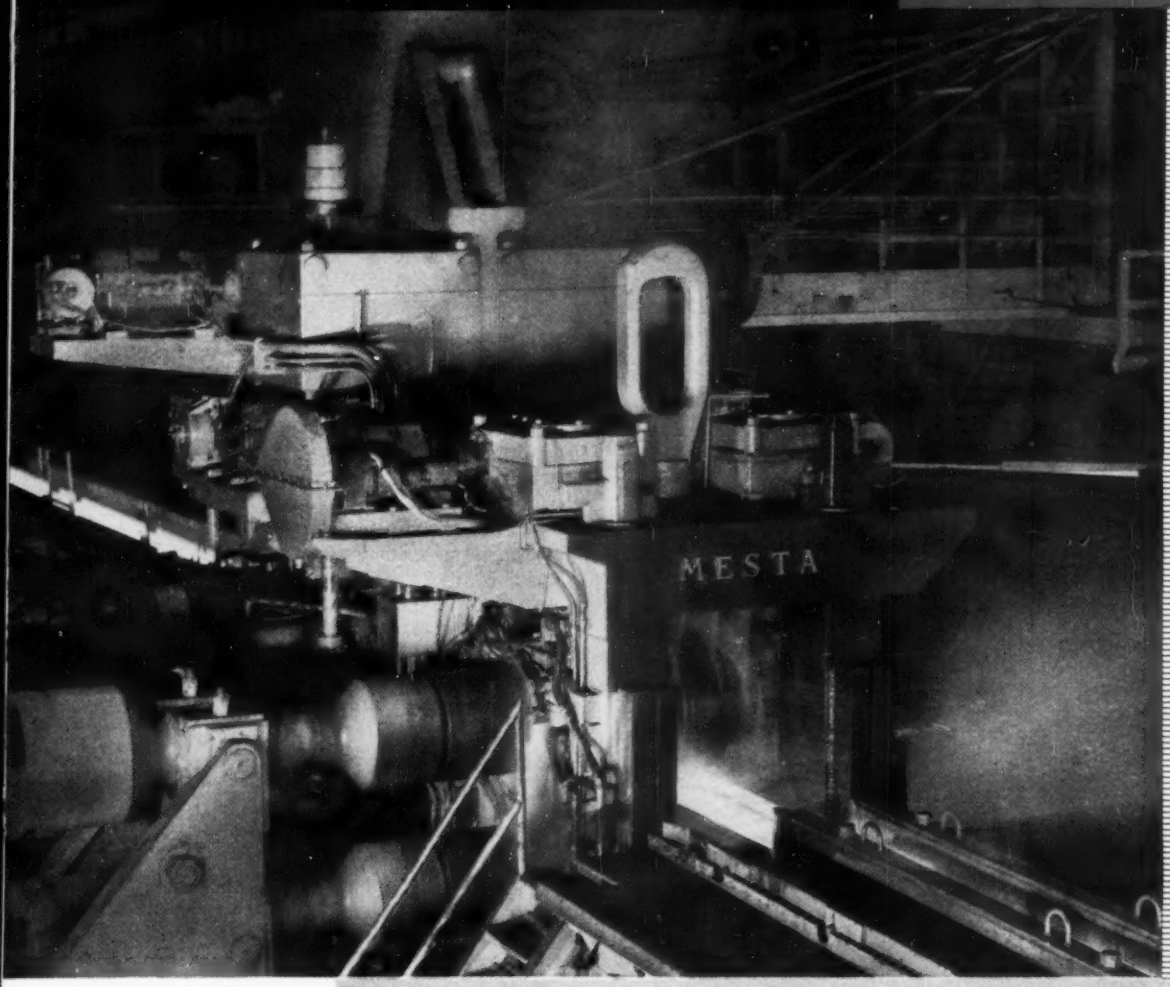
Sheets come directly from the hot mill after annealing and pickling. Partly finished sheets used to be stacked by crane near the entry end of the mill. They were lifted by hand to the feed end and from a conveyor at the exit end.

The mill is nonreversing, so piles at the exit were returned to the feed end by overhead crane. Sheets sometimes were handled 14 times during finish rolling.

On the feed end, some always got dragged over the sheet next in the pack. Even slight scratches, when rolled into a sheet, result in

WIDE FLANGE BEAM AND STRUCTURAL MILLS

Designed and Built by MESTA



MESTA Universal Structural Mill rolling wide flange beams on the 44" Universal Stand and the 34" Edging Stand at Inland Steel Company, Indiana Harbor Works

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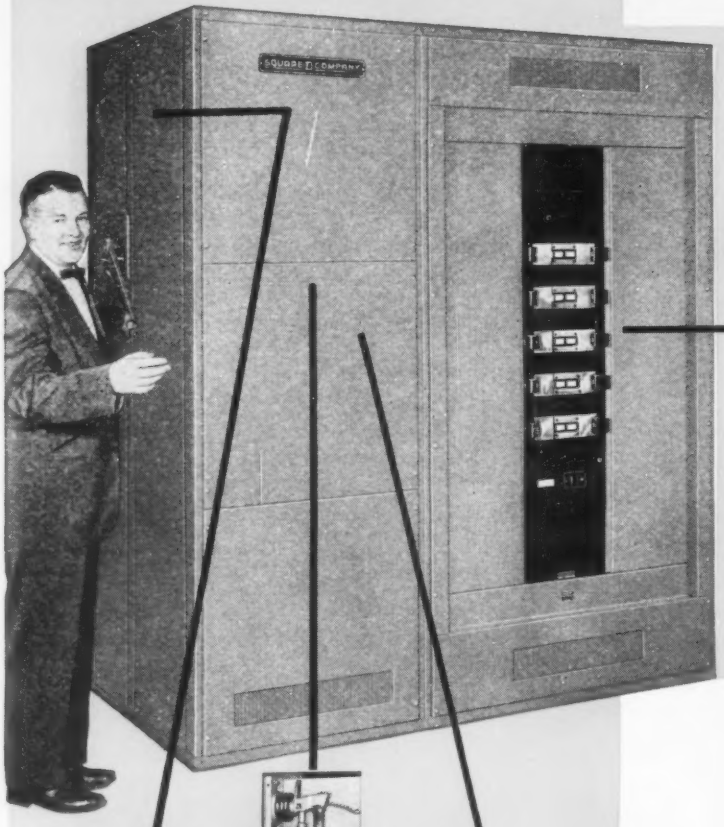
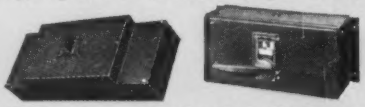
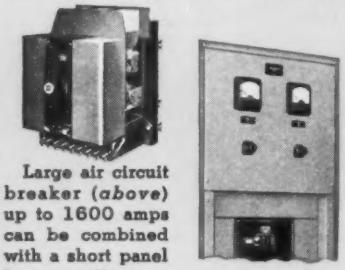
SQUARE D's NEW Unit Substation IN POWER-STYLE CONSTRUCTION



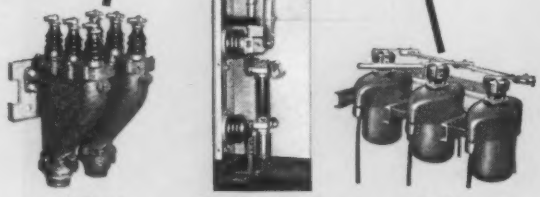
Designed to match Square D's Power-Style switchboards and control centers, these new Unit Substations meet NEMA, ASA, and AIEE standards. Available from 75 to 500 KVA; in primary voltages up to 4800V; secondary up to 600V.



Molded case circuit breakers (*left*) up to 800 amperes and QMB Saflex fusible switches (*right*) up to 600 amperes are available in compact panel construction.

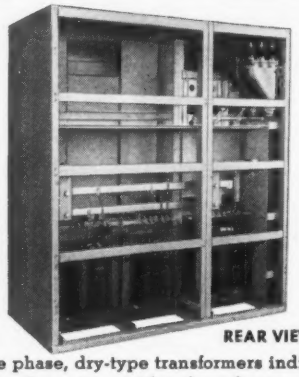


Large air circuit breaker (*above*) up to 1600 amps can be combined with a short panel in one section.



Pothead | Interrupter Switch | Cutout

Potheads, fused or unfused load break air-interrupter switches and fused or unfused oil-filled cutouts are available. Air-interrupter switches and cutouts are easily accessible from front of Substation.



REAR VIEW

3 single phase, dry-type transformers individually mounted on base in ventilated enclosure—heating and vibration held to a minimum. Transformers easily accessible for maintenance and inspection. When no air circuit breaker or metering equipment is used, entire area at top left is available for pull box.

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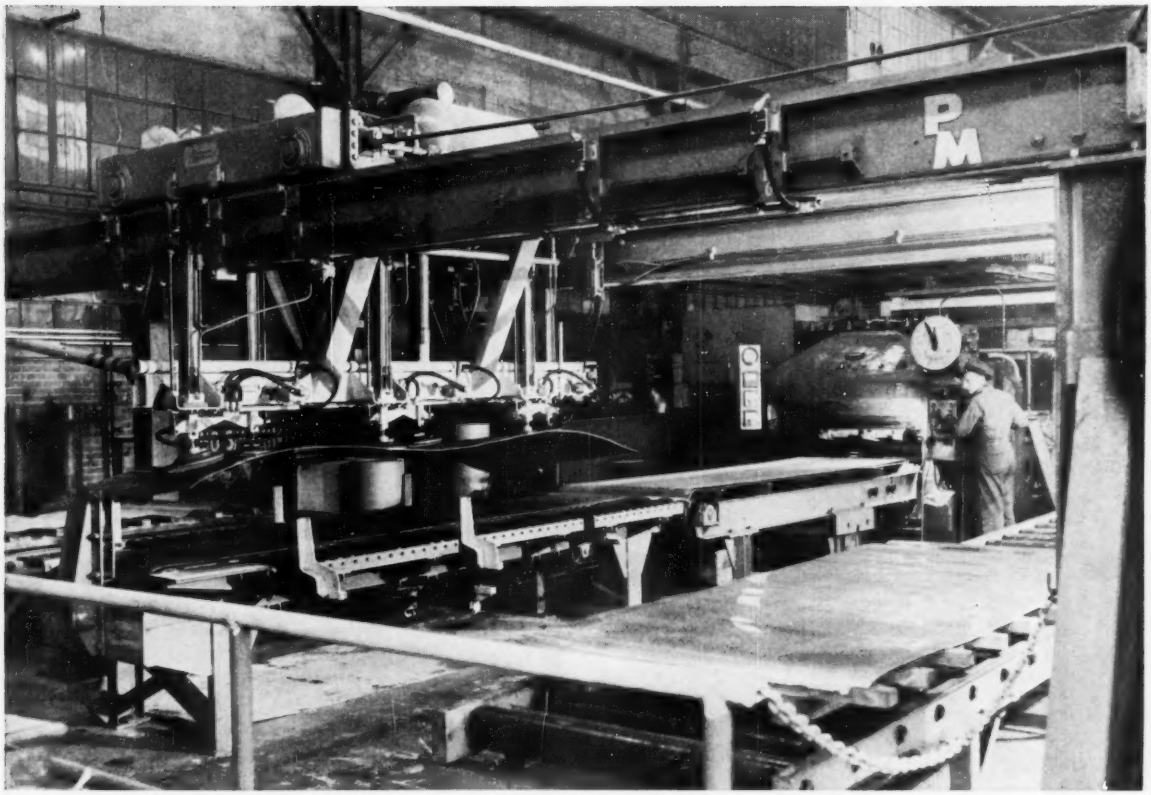


Here is close-up of exit crane. Note that cups automatically adjust to waviness in sheet. Crane stacks on either side. Conveyor on right returns pile for another pass

flaws which don't show up until the metal is polished.

Replacement — Two vacuum cranes, made by Production Machinery Corp., Mentor, Ohio, eliminate the hand operations. (Vacuum is used because austenitic stainless is nonmagnetic.) One positions sheets on the feed table. The mill operator controls the cycle.

After the sheet is rolled, it is automatically picked up by the exit crane, stacked on either side, or returned for another pass.

The exit crane works automatically. It is actuated by sheets when they reach the end of the conveyor. The entry crane automatically picks up a sheet and holds it until the operator pushes a button.

No Scratches—The crane touches the sheets with rubber cups. It lifts and lowers the sheets vertically to prevent scratching. Quality is improved, and the number of rejects is sharply reduced.

Cranes are designed for rapid handling of a wide range of sizes and gages. Hydraulic drive permits quick traverses. It operates at 6 fps during most of the travel, decelerating to ¼ fps before stopping.

Source of Power—Vacuum for lifting comes from a pump mounted on the crane. It eliminates dragging hoses from the support. A trolley duct provides electric power.

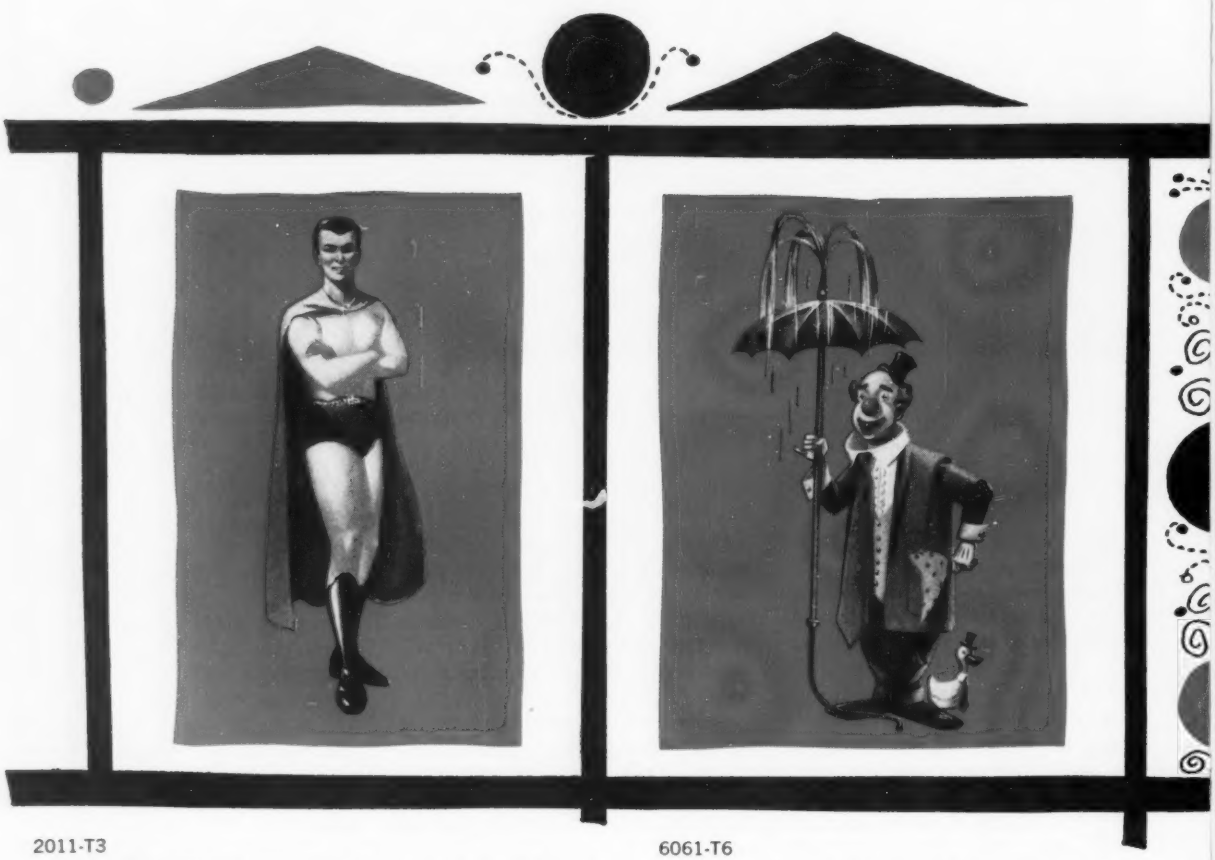
Cups are mounted on a universal joint, allowing a 35-degree tilt. Six are used. They function satisfactorily even when there is a 12 in. variation in the level of the sheet. (Hot-rolled sheets, stacked one on another, have a wavy surface.) One cup will lift the sheet even if the other five aren't engaged.

Practice—Atlas rolls sheets of varying length in one pack. When short sheets leave one or more cups open, the operator lets them run through without bothering to cut out the extra cups. Each will lift about 300 lb. Sheets are laid down before the vacuum is cut to avoid dropping.

A pushbutton controls the de-piler crane at the entry side. The other end is controlled from a panel on that side of the mill. The operator can start, stop, or repeat any operation. Normally, cycling is automatic, and the de-piler at the entry end goes through these steps:

1. Solenoid valve starts hydraulic traverse mechanism.
2. Crane accelerates to 6 fps.
3. Crane decelerates to ¼ fps and stops.
4. Air cylinders lower sheet to entry conveyor.
5. Sheet is deposited.
6. Air cylinders raise cups.
7. Crane returns to initial position.
8. Air cylinders lower cups, which touch top sheet on pack.
9. After a time delay, cylinders raise cups and sheet. Sheet is held until cycle button is pressed.

ALCOA'S NEW COLOR MOVIE



2011-T3

Here's the "Lightweight Champion of the Machining World." Watch this free-machining aluminum alloy perform amazing feats of economy and versatility through a blizzard of fine, crisp chips. It's just the ticket for most screw machine products.

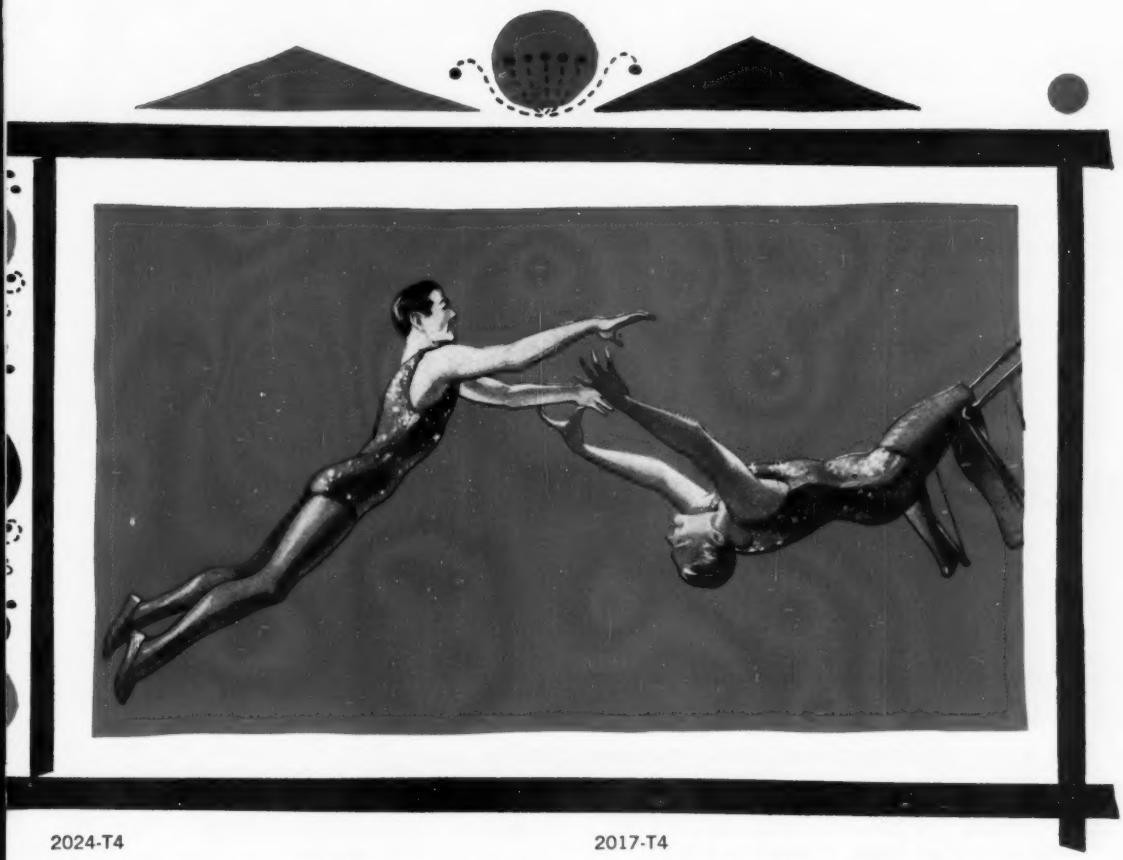
6061-T6

The fabulous alloy that's unequaled where service calls for exceptional resistance to corrosion, suitability for welding or brazing. It's the most finishable of the aluminum screw machine stock alloys.

FREE SHOWING

Be sure to see these amazing alloys perform their spectacular feats of strength, economy, machinability, finishability and corrosion resistance. Determine a date for a showing to your group and contact your nearest Alcoa sales office. They'll confirm a show date for you and send the film to reach you in time for your meeting. No charge. Aluminum Company of America, 874-M Alcoa Building, Pittsburgh 19, Pennsylvania.

"THE FOUR AMAZING ALLOYS" DEMONSTRATES THE VERSATILITY OF ALCOA ALUMINUM SCREW MACHINE STOCK



2024-T4

The daring "Aircraft Alloy." Noted for its strength. Tops where tight, vibration-, strain- and wear-proof assemblies are a must.

2017-T4

The startling alloy that's priced lowest of the aluminum screw machine stock alloys. Handles tough service jobs with a high degree of machinability.

Your Guide to the Best in Aluminum Value

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SCREW MACHINE STOCK
ALUMINUM COMPANY OF AMERICA

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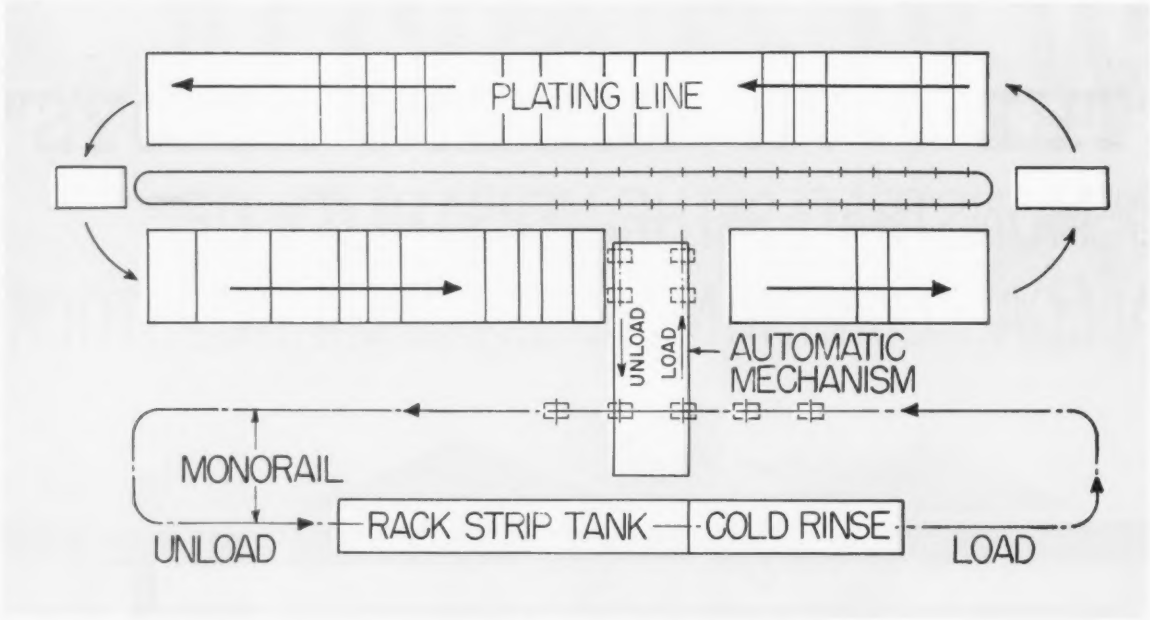
ALUMINUM COMPANY OF AMERICA
874-M ALCOA BUILDING, PITTSBURGH 19, PENNSYLVANIA

Please send booklet with direct quotes from industry leaders on why they buy from Alcoa.

NAME..... TITLE.....
COMPANY.....
ADDRESS..... CITY..... STATE.....



Plating line (top) readies two racks every 72 seconds. Transfer (center) removes them and places two others on plating conveyor. Monorail (below) is on lower level

Loader Speeds Plating Line

Automatic handling of plating racks permits joining service monorail and plating line. Firm says one machine does work of five men, cuts manpower, and improves quality

AUTOMOBILE bumpers and grille guards are being plated at twice the former rate by Eaton Mfg. Co.'s Cleveland Stamping Div.

The reason: A conveyor which features an automatic transfer device. It eliminates manual lifting of heavy plating racks, and combines chrome and nickel plating lines, which were separated.

Ralph Everstine, chief electrochemist, says that the installation has cut manpower and turns out better parts.

Preparation — Before plating, parts are polished and buffed to eliminate die and welding marks. Parts are 10 to 34 in. long, and weigh ½ to 8 lb.

The plating conveyor uses a double file system. Either lane can be operated independently. (It permits closing down one for servicing solution tanks.) Each can also be operated at a different current density, permitting segregation of shapes for improved deposition.

Two Lines—The electroplating conveyor handles 50 carrier loads of parts every hour. Parallel to it is a monorail at floor level. It carries racks with unplated parts to the loader and returns with racks carrying plated parts. The loader is a mechanical connection between the two lines.

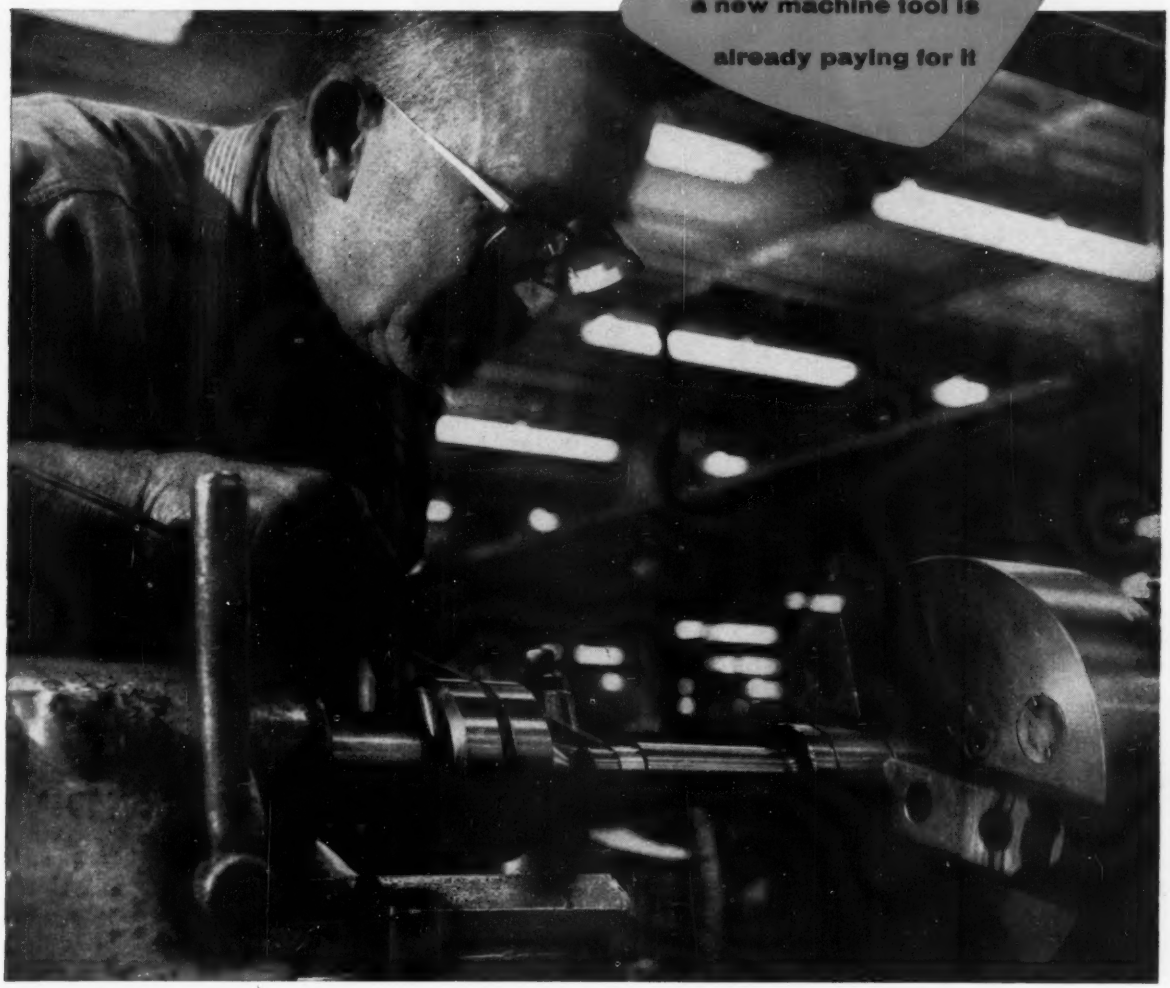
Every 72 seconds, two racks of plated parts are ready to be unloaded. When in position, the automatic transfer lifts them into the unloader.

At the same time, two racks of raw parts are placed in empty carriers on the plating machine. The transfer mechanism shuttles racks with the plated parts to the monorail conveyor for unloading and picks up a new load of raw parts. The monorail carries racks after unloading through manual emptying, stripping, rinsing, and reloading.

Co-ordinated—All controls for the monorail, loader, and electroplating machine are centralized for co-ordination. Manual controls are

JONES & LAMSON MACHINE COMPANY

the man who needs a new machine tool is already paying for it



Still useful, yes . . . but is it still Profitable?

When the purchase of new machine tools comes up for discussion, it's not at all unusual for someone to comment — "but our present machines still seem to be doing a good job".

On the surface, this objection seems to make good sense. It doesn't stand up, however, because it isn't good economics.

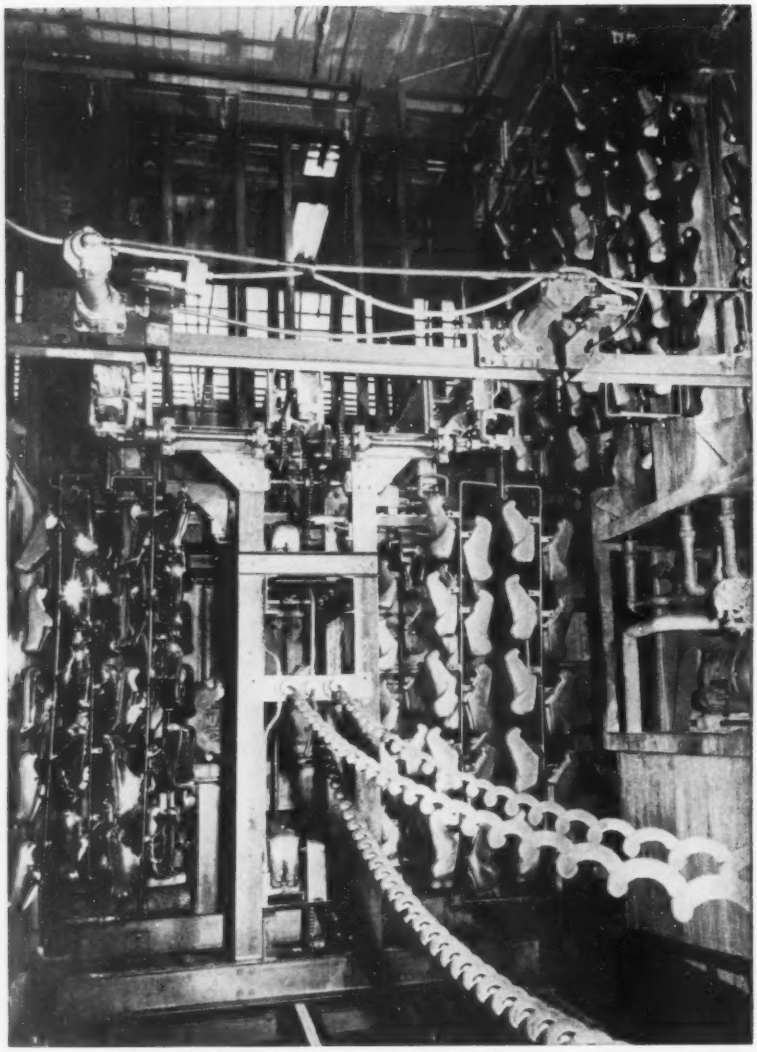
While surveying a number of metalworking plants recently, a prominent industrial publisher discovered this startling fact: — *In every plant with machinery more than ten years old, profit margins were steadily falling!*

Why should this be the case, especially when sales were at an all-time high?

The answer, of course, is that older, still "useful" machines cannot produce enough goods at a low enough cost to compete favorably with new machines on a profit basis.

Write for J & L's Replacement Information Kit, which contains much valuable information. Jones & Lamson Machine Company, 517 Clinton St., Springfield, Vermont.

Turret Lathes • Fay Automatic Lathes • Precision Boring Machines • Thread & Form Grinders • Optical Comparators • Threading Dies, Taps & Chasers



Transfer unit in loading position. Raw parts (right) are about to be elevated to start of plating line. Finished parts at left are being removed. View is from monorail line

provided for forward or reverse jogging. The lines can be restarted from any position.

The automatic loader has two double stations, one for loading and one for unloading. All control and drive mechanisms are exposed for accessibility.

Racks of raw parts move into position at the plating machine, following a conventional flow pattern. Finished racks move away on the same hooks—there is no mixing of raw and finished stock on alternate hooks.

The loader also permits the synchronization of two plating operations using a common monorail. It can serve for intermediate operations like degreasing, drying, or rack stripping.

Plating—Eaton's plating operation takes parts through 30 immersions. Raw parts pass through several washes, acids, and cleaners. They remain at nickel plating for 55 minutes before further rinsing.

Chrome immersion takes 5 minutes. Electroplating is complete after several additional rinses. Any tank can be bypassed.

Maker—The transfer machine was made by Hanson-Van Winkle-Munning Co., Matawan. N. J.

Beryllium Expands

New plant points up future of the metal. Structural applications are forecast

PRODUCTION uses and continuing research into the techniques of manufacturing beryllium parts were emphasized at the dedication of Brush Beryllium Co.'s plant at Elmore, Ohio, on Nov. 17.

Production—The new plant will produce 10,000 lb of vacuum cast beryllium a month—enough to supply half the Atomic Energy Commission's requirements, plus some for private industry. (For details of the AEC's use of metal and its properties see STEEL, Aug. 19, p. 152.) The vacuum cast ingots are made into a fine powder at Brush's Cleveland plant, then pressed and sintered into large blocks from which wrought products are made or parts are machined.

The $4.5-million plant will also produce 20,000 lb of beryllium hydroxide a month. This material will be used at the Elmore plant in making master alloys, such as beryllium-copper ingots, and in continuously cast billets of beryllium-copper. Other uses include beryllium oxide refractories.

Research—A pilot rolling mill at the Elmore plant will develop techniques for the production of wrought products. Basic research in fabricating techniques is carried on at Cleveland.

The process development laboratory at Elmore will produce pilot-plant quantities of special beryllium compounds.

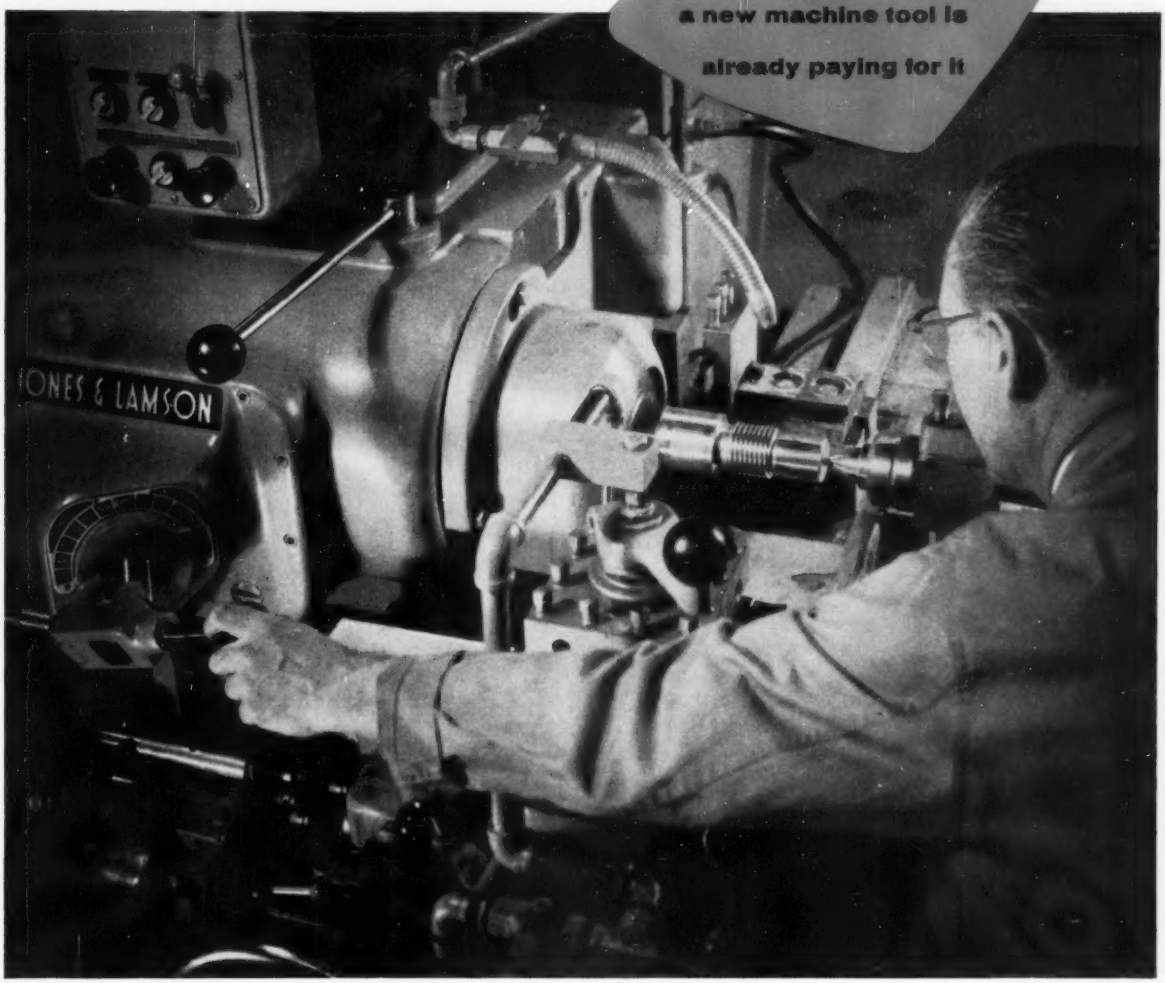
Predictions—Beryllium's nuclear, mechanical, and thermal properties, says Brush, indicate continued large scale use in nuclear reactors—particularly portable ones like those being designed for aircraft.

The company says the metal is being studied and flight tested for aircraft construction. Its high strength and lightness will permit design of structural assemblies much lighter than those now used.

Rockets—The re-entry of high speed missiles or spacecraft generates high frictional heat. Such sudden heat loads can be absorbed by beryllium, says Brush. Its melting point, thermal conductivity, and heat capacity are high.

JONES & LAMSON MACHINE TOOLS

the man who needs a new machine tool is already paying for it



The Turret Lathe with a fully automatic thread-chasing cycle!

Here is full turret lathe versatility and a threading attachment with a fully automatic cycle — all in one machine. Now you can be sure of concentricity of threading with other lathe work, *all done in one chucking*, with the time saving of the Auto-Threader!

This Auto-Threader will chase straight or taper threads — or a combination — internal or external, from the front of the machine.

Other features include: uniform thread length, by means of positive stop and follower nut disengagement together with rapid tool withdrawal; precision lead control by full depth follower nut engagement on a hardened and ground leader.

Write for descriptive folder No. 5440. Jones & Lamson Machine Company, 517 Clinton Street, Springfield, Vermont.

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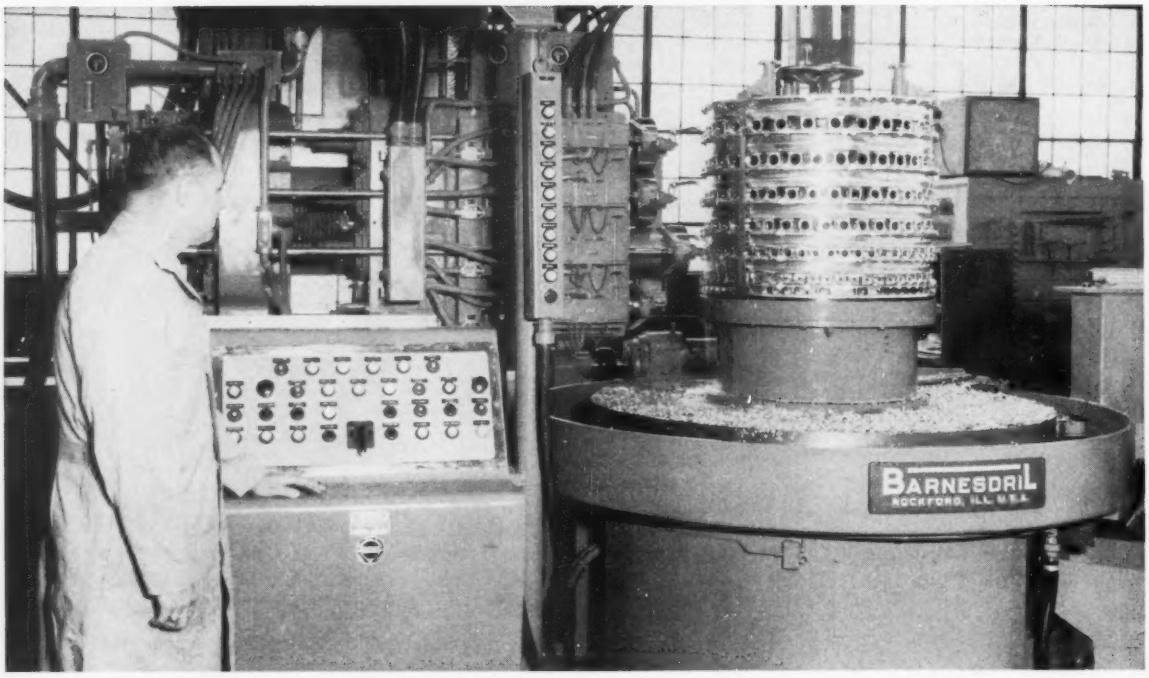


A jet engine compressor housing with 248 holes is machined automatically in about 5½ hours. Numerical controls govern the cycle

Tape Guides Jet Engine Boring

User expects to cut setup and machining time by nearly 75 per cent. The machine will do the work of three standard boring mills and should turn out more consistent work

WITH TAPES guiding it through intricate cycles, a horizontal boring machine will process 248 holes in jet engine compressor casings at General Electric's Evendale, Ohio, plant.

The cycle time will be about 5½ hours. Setup and machining time are expected to be cut 74 per cent.

Cycle—Four spindles will bore and generate a front face and back counterbore at each of the hole locations. The same job now takes three standard boring mills, say GE officials.

The operator locates the part in the fixture with an alignment telescope. After the cycle is started, a punched paper tape guides the tools to complete the part. Since there are four controlled spindles, as many as four operations can be done on any hole.

All positioning of the spindles and table rotation come from the tape. The machine has a heavy duty boring head mounted on a compound slide. The head holds a precision boring spindle and three hydraulically actuated, feed-out quill and spindle assemblies. They are individually controlled for three different feed ratios. The spindle will locate vertically over a maximum range of 40 in.

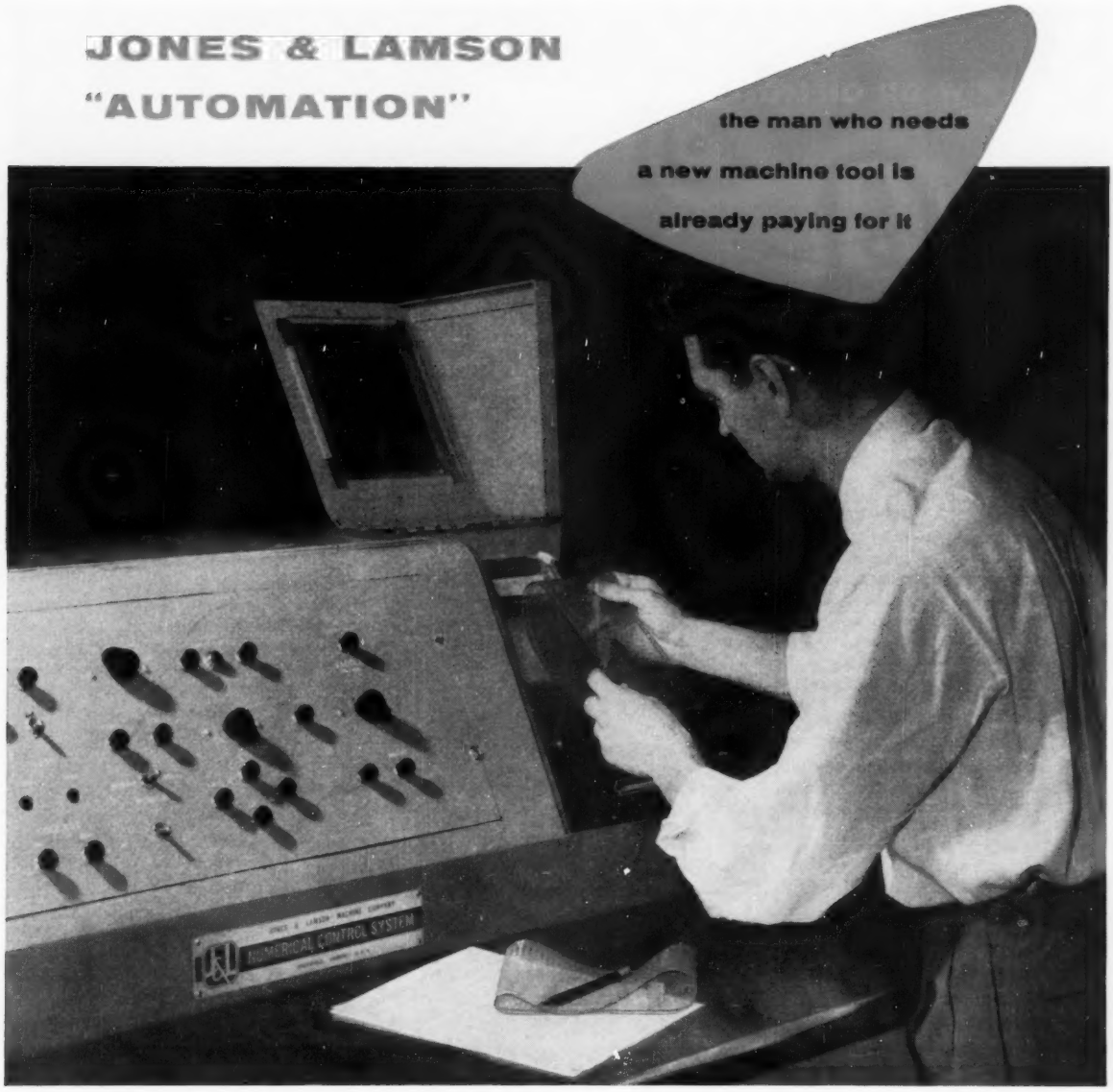
The 55-in. rotary table indexes through 360 degrees from a reference point at a speed of about 5/6 rpm. (Engineers point out that this speed of rotation could be used as a feed for milling the periphery of the part.) The table has a lifting mechanism for rotation and a clamp for locking the table in position.

Built by Barnes Drill Co., Rockford, Ill., the machine maintains an accuracy of 0.005 in. true position and repeatability of $\pm$0.001 in. All feed screws, including the spindle feed-out screws, are precision engineered ball screws.

Control — A GE-designed electronic control actuates the machining cycle and performs seven programmed functions: It picks the motions to be actuated and sets spindle advance, spindle speed, spindle feed, depth of feed; then it tells whether to position only, or position and drill, and decides on dwell, no-dwell, and backfeed combinations.

The control unit gets its information from standard eight-channel Flexowriter tape.

JONES & LAMSON "AUTOMATION"



J&L's Unique Approach to "Automation"

"Automation" is a tricky word — one that has many definitions. However, at Jones & Lamson its basic meaning is always the same . . . "the solution to a cost reduction problem".

In some cases, this could involve automatic in-process gaging, size adjustment feed back, self-resetting of tools, and automatic handling for long runs on single machines. Other problems might call for an articulated, sequential *line* of machines, complete with automatic handling, inter-machine transfer and automatic control of speeds, feeds, etc.

Through numerical control, using punched tapes, J&L "automation" *also greatly increases small-lot flexibility*. In this case, machine set-up and change-over become primarily an office procedure.

We would be pleased to show you how J&L's approach to "Automation" can be put to good use in *your* operations. Write for literature — Jones & Lamson Machine Company, 517 Clinton St., Springfield, Vermont.

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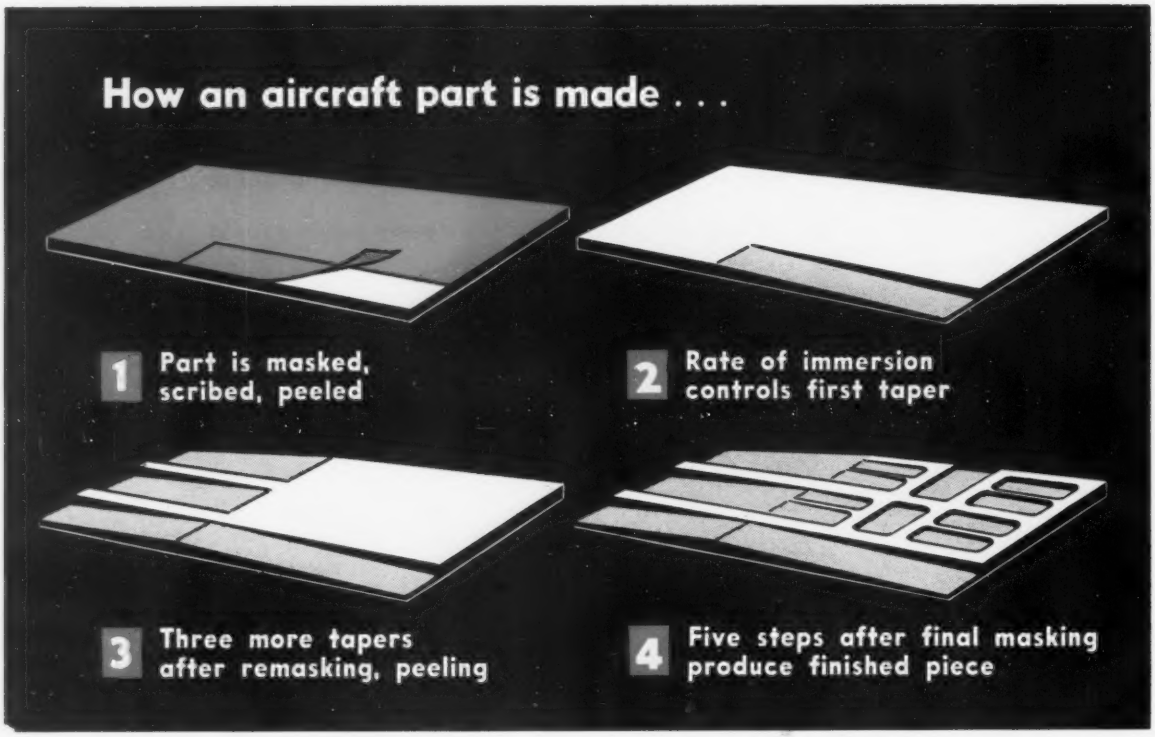

How an aircraft part is made . . .
1 Part is masked, scribed, peeled
2 Rate of immersion controls first taper
3 Three more tapers after remasking, peeling
4 Five steps after final masking produce finished piece

Chem-Milling Handles Tough Job

It takes place of nine parts which were riveted or bonded. Stiffening is built in. Method is gaining wide acceptance in production of replacements for complicated subassemblies

THE PART above is said to be one of the most outstanding examples of complex chemical milling.

It illustrates the design possibilities of the method: Nine parts formerly riveted or bonded are replaced by a single piece. Stiffening is built in.

Production—The milling is done at the U. S. Chemical Milling Corp., Manhattan Beach, Calif. Each piece has three taper angles. The final shape takes nine operations.

After the plate passes through staging and cleaning, a masking coating is applied to restrict metal removal. The area to be cut is scribed and the masking removed.

Immersion—The first cut, a taper, is made by controlling the rate of immersion in and withdrawal from the chemical solution. Afterward, the exposed section is again masked and three additional areas scribed, stripped, and tapered.

As soon as the three tapers are finished, the part is completely masked, and the deepest cut scribed, stripped, and milled.

The final five steps are comparatively shallow, and the part requires no further masking. As each area is scribed, stripped, and milled, the additional metal removed brings all six cuts to their final dimensions.

Weight Saving—Airplanemakers are the biggest boosters of chemical milling. Here are some of its advantages:

1. The method gives designers greater latitude in part shapes. Complex forms, broad or narrow cuts, and sharp corners are possible in one operation. Parts can be formed before or after chemical milling.

2. Parts are lighter. The process eliminates riveting, welding, and brazing.

3. The designer can count on closer tolerances: 0.002 in. plus half the sheet tolerance is usual. Machine milling tolerances are 0.010 in.

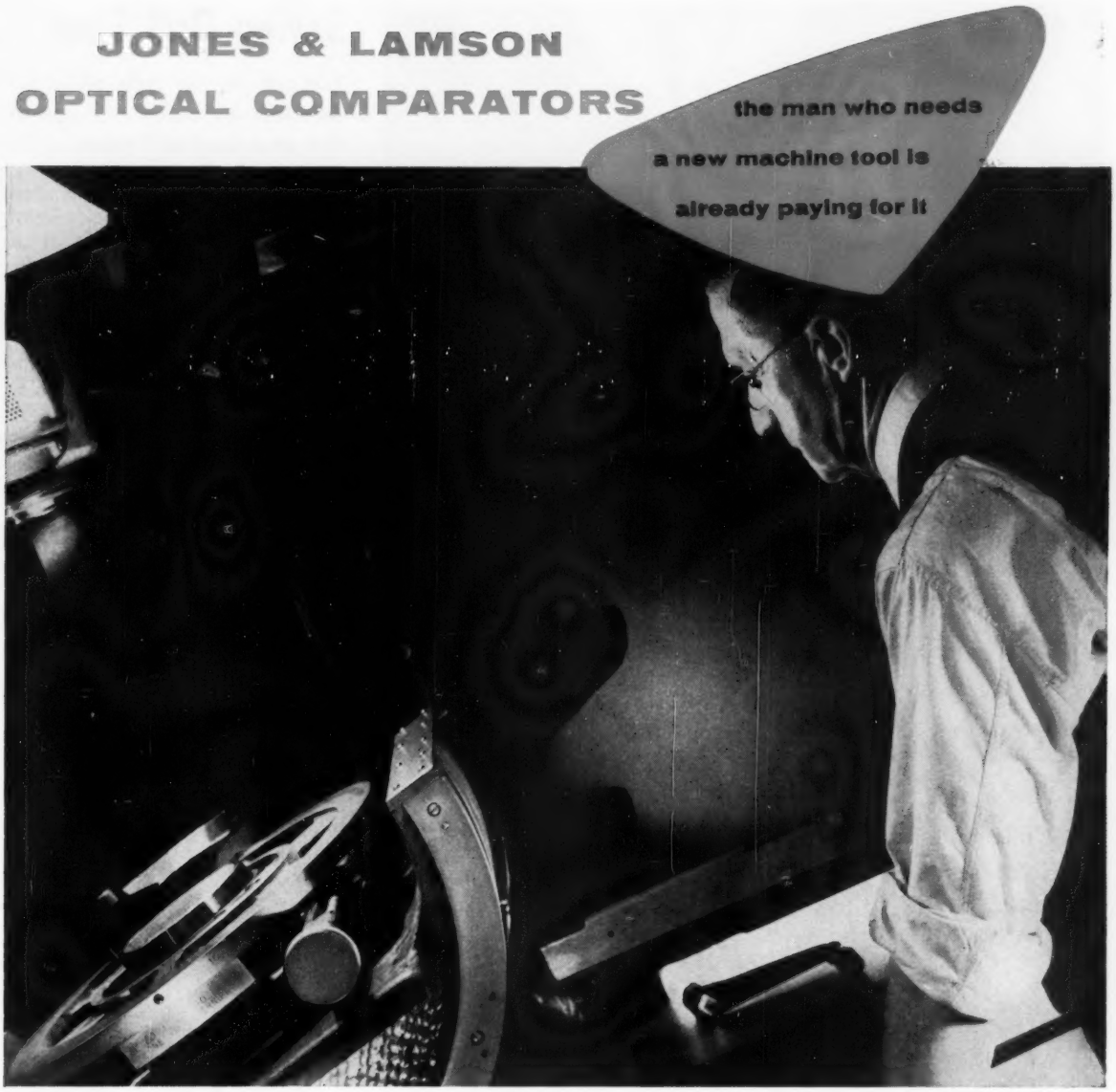
4. Tooling is simpler than that for machining.

5. No final sanding or polishing is needed.

6. No special equipment is needed. The process uses conventional cleaning tanks and paint spray booths.

7. Labor cost is comparatively low. Highly skilled operators are not needed.

JONES & LAMSON OPTICAL COMPARATORS



Simulated machining operations give production control as well as absolute inspection

At J&L we answer an inspection problem by asking, "How was the piece made?"

Take, for instance, this inspection of broached slots in turbine discs. Holding fixtures are similar to those used in the actual broaching operation. Measurements are taken, right and left, as on the broaching machine. During inspection, the part moves in the same planes as it does while it is being machined. And the combination of light, optics and chart act as the cutting tool.

Through this visualization of the machining operation, it is a simple matter for the operator to take measurements on the comparator and then go back to the broaching machine to make any necessary adjustments.

Thus, with J&L, you not only inspect end products but, more importantly, you find out *where* and *when* to adjust the manufacturing process. Write to Jones & Lamson Machine Company, 517 Clinton Street, Springfield, Vermont, for literature.

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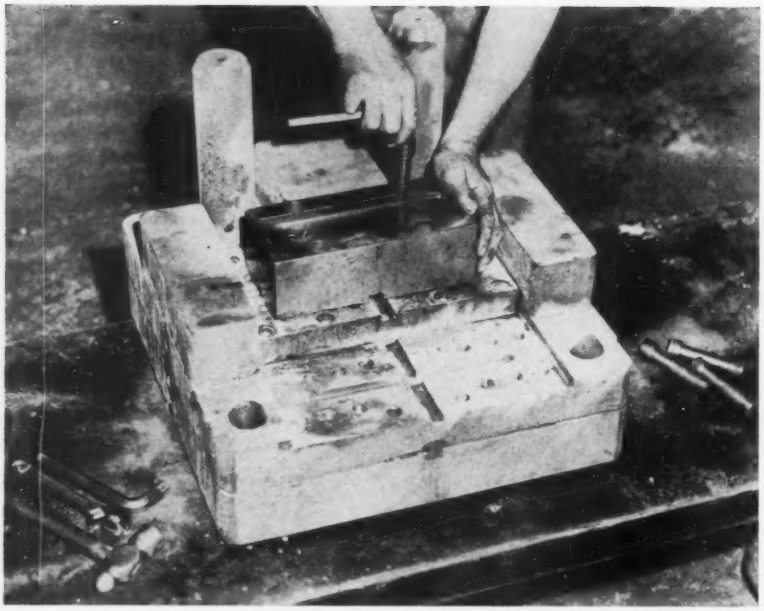


Workman is installing forging die on holder. Wire thread inserts greatly reduce stripping, seizing, galling, and corrosion

Inserts Up Die Holder Life

They eliminate thread failures. Spring qualities provide up to 90 per cent thread engagement, improve load distribution. They are said to lengthen holder life seven times

WIRE thread inserts have cut maintenance costs and increased the life of holders for hot forging dies at the Forging & Screw Machine Div., Scovill Mfg. Co., Waterbury, Conn.

The installation eliminated thread failure, one of the most frequent sources of failure. Holder life has been increased seven times.

Problem—Steady vibration of heavy forging presses loosened hold-down bolts. Threads were damaged, and dies moved out of alignment. Billet scale also fell into unused holes and prevented tightening the bolts on a larger die.

Sometimes, an operator inadvertently placed a cold billet in the die when starting a new run. The die halves would stick together and hold-down bolts usually pulled out, stripping the threads.

Old Solution — Each time a thread was stripped or became worn, the die holder was returned to the machine shop. It was welded, drilled, and retapped.

Unless another die holder was available, the press was down for at least 4 hours.

New Way—All die holders are now fitted with wire thread inserts made by Heli-Coil Corp., a division of Topp Industries Inc., Danbury, Conn. Here's how they are installed (standard bolts are ¾ in. in diameter):

Drill 25/32-in. hole; tap threads with a ¾-10 Heli-Coil tap; install ¾-10 inserts.

Insert liners are said to increase the safe load carrying capacity by as much as 30 per cent, compared with unprotected tap holes. Load distribution is better; threads are practically free from wear by vibration, assembly, and disassembly.

Saving Drill Time

You can shorten cycle on larger machines by doing one operation on a small drill press

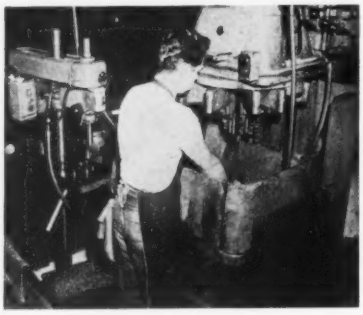
COMBINING drilling and chamfering of flanged hubs cut the cost of the operations almost in half at the Automotive Div., Clark Equipment Co., Jackson, Mich.

The move also reduced handling and machine time on a larger drill.

Auxiliary — An operator drills flanged hubs for automatic converter transmissions. He loads a part on the drilling machine table and presses the start button. Holes are drilled, tools retracted, and stopped automatically.

During the automatic cycle time, the operator chamfers the holes of a previously drilled flange. He uses a Walker-Turner 15 in. drill press which is next to the automatic drilling machine.

Previously, the operator had idle time during the drilling cycle.



SMALLER PRESS
. . . saves time for big one

Other Examples—Clark uses several small drill presses. They can be easily moved for short runs.

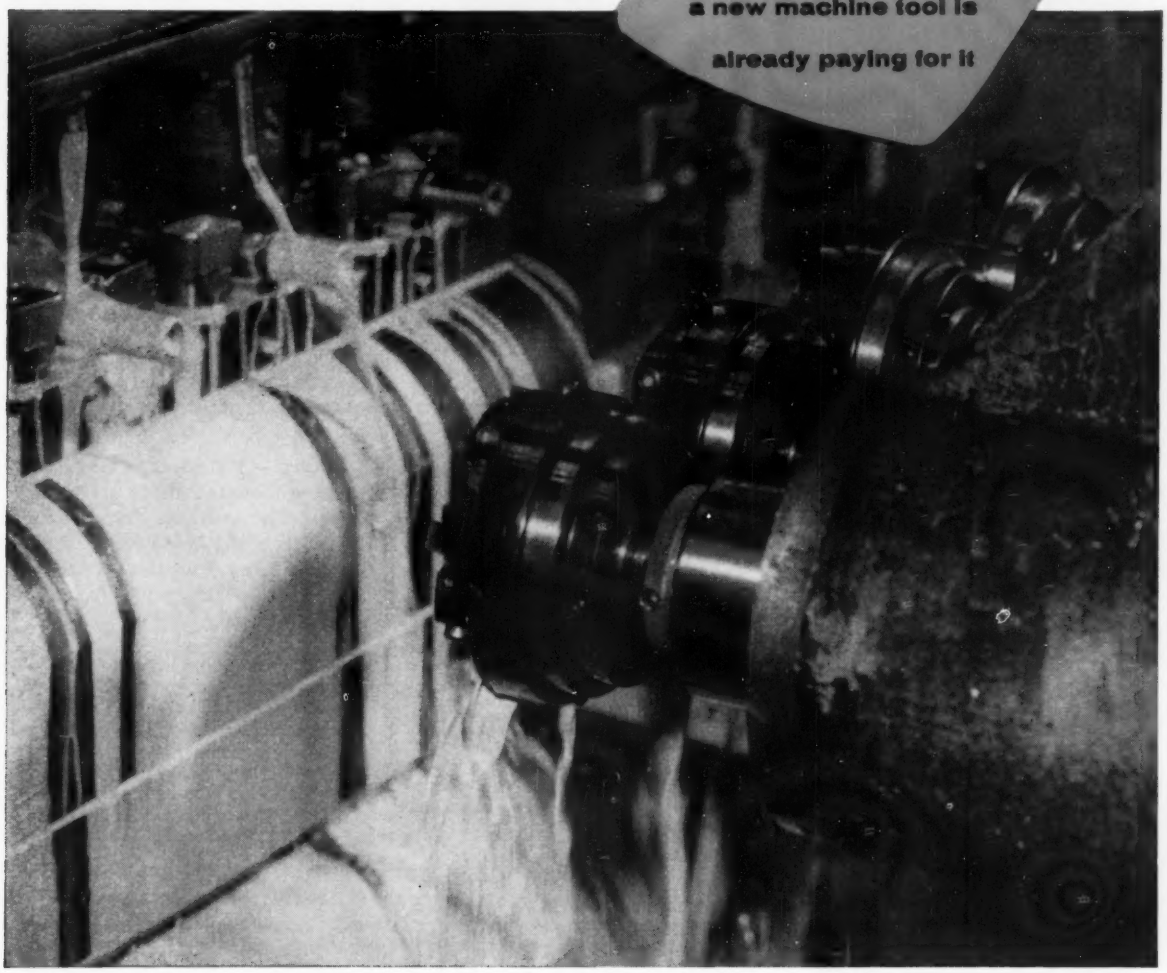
In addition to direct labor savings, the firm feels that cycle time reductions on a larger machine are worth its investment in smaller drill presses.

Standby — Engineers point out that several drill presses operated in tandem can be put into emergency service when production machines are down. Such setups can include coolants and cutting fluids.

With suitable fixturing, drill presses can counterbore, spotface, undercut, and even mill. On one occasion, the machine was used to grind a small radius.

JONES & LAMSON
THREAD TOOLS

the man who needs
a new machine tool is
already paying for it



Wholesale Hollow Milling with J&L Die Heads

This is part of a transfer machine set-up that uses 48 J & L Die Heads on hollow milling operations. Rough and finish turning is performed on both ends of automotive suspension shafts, as 1440 finished parts come off the line every hour.

Even in single spindle set-ups, hollow milling chasers in J & L Die Heads remove metal *four times faster* than single point tooling. And in many cases, J & L threading Die Heads can be adapted to hollow milling, by merely using the required turning chasers.

Chasers for multiple turning and contour forming, as well as straight or taper turning, can be used in J & L Die Heads for hollow milling on most types of turning equipment.

Write for booklets — "Hollow Milling with Die Heads", and "Let's Talk about Thread Tools". Jones & Lamson Machine Company, 517 Clinton Street, Springfield, Vermont.

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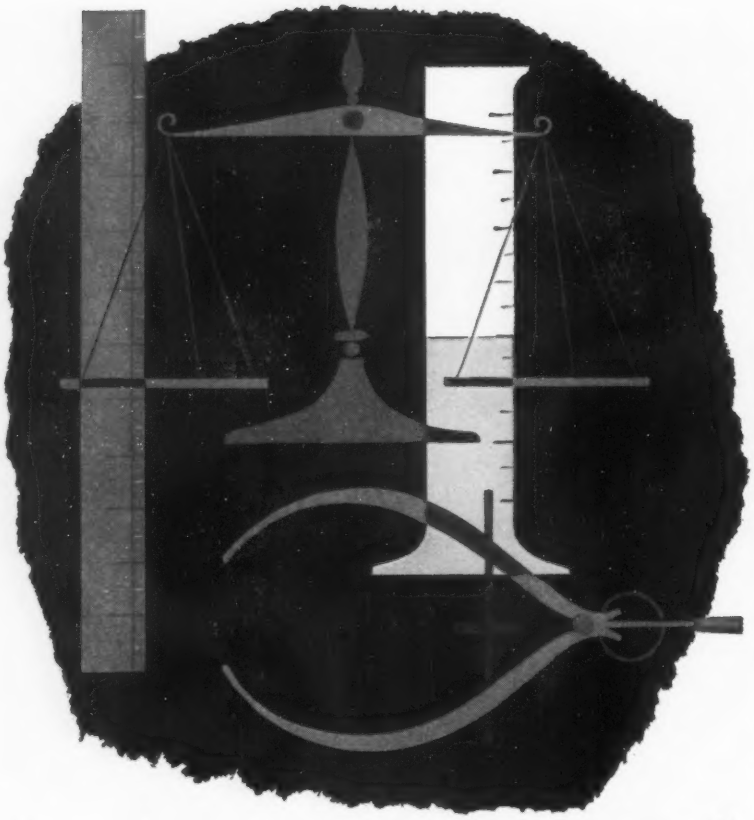


how do you measure economy?

economy is not measured by price alone!

PROVED OVER THE YEARS

When you are concerned with metal abrasives there are many yardsticks that must be applied to truly measure economy.

How long will an abrasive last? How long before it breaks down into fines and becomes inefficient?

How destructive is the abrasive to machinery and equipment?

How efficiently does it perform and what is the time cycle for good performance?

To sum it all up — the economy of using any abrasive can be measured by the **cost per ton of metal cleaned!**

On every count, Malleabrasive has proved its superiority over the years in hundreds of plants.

If you want to improve the economy of your blast cleaning operations — check Malleabrasive.

MALLEABRASIVE

THE GLOBE STEEL ABRASIVE CO., MANSFIELD, OHIO ®

1907—Fiftieth Anniversary—1957

Updating a Planer

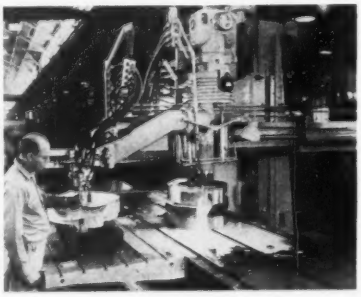
Here's an example of how you can get the most out of your old, single purpose machines

MAINTENANCE engineers at National Supply Co., Torrance, Calif., converted an open side planer into a three dimensional, tracer controlled milling machine.

Power — All movements were changed to hydraulic power. A 25 hp, variable speed spindle replaced the planer tool mount. Speeds can be varied from 60 to 3000 rpm.

Vertical travel of the milling head is 8 in.—two hydraulic cylinders are mounted on opposite sides of the housing. The head can be swiveled. Feed rates are 0 to 25 ipm.

Control—A three-direction tracer valve is mounted above a template table. The operator stands about 48 in. from the spindle center line. Controls are on an arm which extends across the table from the spindle housing.



OLD PLANER
. . . now a tracer mill

The template table (40 by 60 in.) is an extension of the work table. Mounted outboard, it can be moved to any point along the work table.

Supply—Hydraulic power comes from a 30-hp combination unit. It delivers 20 gallons per minute to supply the spindle; a dual pump supplies 11 gpm for rapid table traverse and 11 gpm for feed movement.

Cross and vertical rapid traverse are done by opening the tracer valve. The pendant control starts and stops the spindle and table. For straight cuts, a device automatically deflects the tracer stylus at the end of each stroke.

Soldering Aluminum

You can join it and galvanized metals with a zinc-based alloy. No flux is needed

AMONG the new ways to solder aluminum is one developed by G. M. Bouton and P. R. White, metallurgists, Bell Telephone Laboratories, New York.

It's based on an inexpensive, stable, zinc-base alloy. No flux or abrasion is required. Joints are said to be stronger than the basis aluminum.

The method also works well on galvanized metals.

Refinement — Stability of the joint is insured by careful exclusion of lead, tin, bismuth, and cadmium, and the addition of magnesium and aluminum. The excluded elements are often a source of intergranular corrosion which destroys the joints.

Technique—It is not necessary to remove rolling mill oils or oxides. The joint is heated electrically or by blowtorch. One stroke of the solder stick is enough to penetrate the oxide and wet the aluminum.

Oxide film is lifted off much like paint peeling from wood. When wiped off, surfaces can be joined by adding more solder.

The method, says Bell Telephone, is equally effective on galvanized metal. No flux is needed.

The dark area around solder illustrates how the alloy loosens the oxide layer. Solder alloys with metal beneath. Wiping oxide away eliminates need for flux

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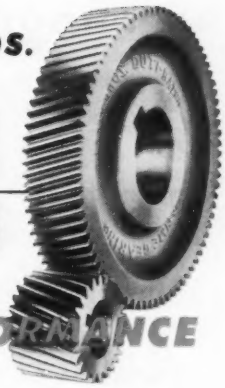
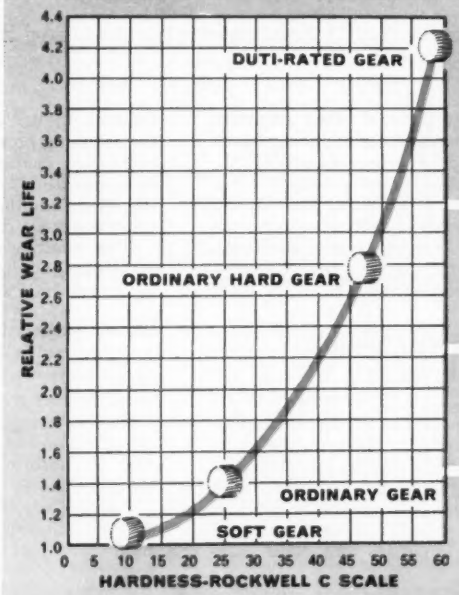


GEAR PERFORMANCE COMPARISON CHART



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An important question for every steel maker:

What is Periclase?

This brief report, which uses no highly technical formulas, answers the question "What Is Periclase" in a concise discussion of (a) the mineral make-up of Periclase as compared to other magnesia materials, (b) why Periclase characteristics make it superior to other magnesias for high performance steel industry applications, and (c) how Periclase is produced by Kaiser Chemicals as the primary ingredient of basic refractories used by the steel industry.

The differences between Periclase and other magnesia materials used for basic refractories are more important to steel makers than to any other group of people.

Why?—first, because the steel industry is the nation's largest user of basic refractory products. *Second and even more important,* because the quality of refractories used has a direct effect on steel-production efficiency. Thus, the quality of the materials in the refractory products he buys is the individual concern of every steel producer.

Magnesia-Bearing Minerals Plentiful In Earth

Magnesia, (magnesium oxide), long known for its excellent physical and chemical properties in basic refractory use, is plentiful in natural forms in the earth. But in its natural form, such as found in brucite, dolomite and magnesite, it is almost always found combined with additional oxygen, lime, water and mineral impurities. These additional materials weaken or destroy many of the chemical and physical properties that make magnesia a good refractory.

On the other hand, natural forms of *pure crystalline* magnesia—known as Periclase—are rarely found in the earth. To obtain commercial quantities, it must be produced synthetically.

Periclase vs. Magnesite In Refractories

A closer comparison between Periclase and one of the commonly used natural materials—Magnesite—will show the nature of the difference in materials . . . and how these differences affect refractory performance.

A single grain of either Periclase or magnesite the size of a grain of coarse sand is composed of several thousand tiny magnesium oxide crystals. In both cases, these crystals are held together as a grain by some form of bond or bonding ingredient.

The manner in which the individual MgO crystals are bonded together into grains determines their ultimate performance in refractory service.

How Magnesite Impurities Form Grain Bond

To obtain deadburned magnesite grains, natural magnesite ore (mostly magnesium carbonate) is processed by calcining. Impurities such as lime, silica and iron act as fluxes in the sintering kiln. Burned at temperatures of about 2750°F., most of the carbon is released in the form of carbon dioxide gas, leaving a brownish residue of magnesite grains.

Although calcining raw magnesite crystallizes the MgO and releases the carbon, *it does not remove* the random impurities present in the natural ore. During the calcining process, these impurities soften or liquefy and form a coating around the MgO crystals. When the temperature is lowered at the completion of the calcining operation, these coatings harden and form a glass-like cement which bonds the crystals into grains.

The resulting magnesite grains are composed of 80-90% MgO crystals and 20-10% other minerals which have combined to form the glassy bond.

How "Impurities Bond" Affects Performance

Although MgO crystals can withstand temperatures of over 5000°F. without appreciable change, the glassy bond formed by the impurities cannot. Even at relatively low temperatures, these impurities again soften or liquefy and lose their ability to hold the MgO crystals together, permitting them to fall apart under stress (with the liquids even acting as a lubricant!).

As with the weakest link of a chain, the degree to which deadburned magnesite grains can withstand high temperature, physical stress and chemical attack *is determined by the low-melting impurities* rather than by the highly refractory MgO.

How Periclase Is Obtained From Sea Water

Of the several ways to obtain Periclase, one of the most efficient is the sea water process developed and used by Kaiser Chemicals. Because magnesium is present in sea water as magnesium chloride (a salt), magnesium hydroxide is precipitated when sea water is reacted with calcined dolomite.

This hydroxide is then thoroughly washed in fresh water to remove the calcium chloride and other soluble impurities. Finally, the pure magnesium hydroxide* is passed through filters to remove much of the excess water, and the resulting paste (known as filter-cake) is fed into high-temperature kilns for calcining.

Two Methods For Producing Periclase Grains

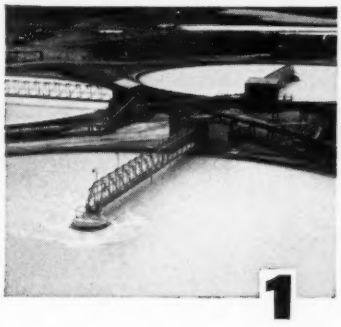
The fact that Periclase is synthesized allows us to control and vary the manufacturing process to produce a "custom made" product.

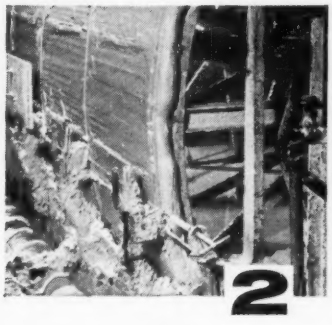
Standard high purity Kaiser Periclase (92% MgO) is produced by adding a small, precisely-controlled amount of very fine pure silica (SiO_2) to the filter-cake just before it is fed into the kiln. During the calcining operation the silica reacts with a portion of the MgO to form magnesium orthosilicate. This highly refractory mineral bonds the individual MgO crystals into grains.

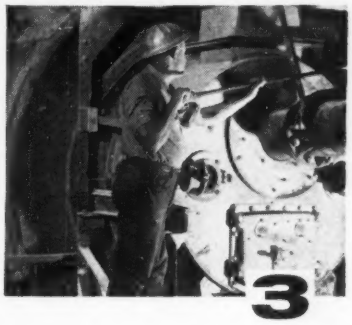
Magnesium orthosilicate is an excellent bonding ma-

*At this hydroxide stage it is similar to the milk of magnesia used for toothpastes and medicinal purposes.

FOUR PRIMARY STEPS IN PRODUCTION OF PERICLASE FROM SEAWATER





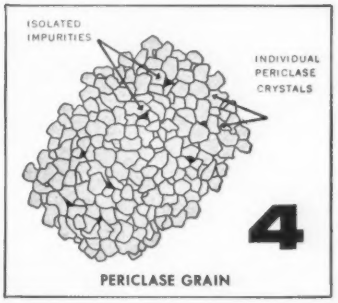


1 When granular dolomite is added to treated seawater in this reactor, magnesium hydroxide is precipitated, washed and processed through several thickeners.

2 Next step is the vacuum filter where excess water is removed. The resulting "filter cake" is discharged on a screw conveyor for movement to kiln.

3 At the kiln, patented mineralizers are added to the filter cake. Under heat, these additives cause chemical reactions which bond MgO crystals into Periclase grains.

4 For extremely high purity Periclase, a chromium compound is added to the filter cake. This additive—under extreme heat—causes MgO crystals to lock themselves together in a "crystal bond" (no liquid phase) to form high density, low porosity Green Grain Periclase.



terial as it is similar in many respects to MgO itself. In contrast to a glassy magnesite bond, subsequent cooling or reheating does not shrink or liquefy this crystalline bond.

In addition, unusually high kiln temperatures are used in the production of Kaiser Periclase. These high temperatures cause individual crystals to combine into larger, more stable crystals. At the same time, the intense heat reduces the overall mass by shrinking the newly formed grains. In passing through the hottest point in the kiln (3300°F.) this mass is shrunk to its maximum density and minimum porosity. The result is a dense, high purity Periclase grain of very low porosity and exceptional volume stability.

Second Method Produces "Crystal Bond"

For very severe applications, Kaiser Chemicals engineers developed an even higher purity Periclase grain —96% MgO. Known as Green Grain Periclase, it is produced by adding a minute amount of chromium compound to the filter cake as it is being fed into the kiln for calcining. The effect of this patented mineralizer is to induce a phenomenal recrystallization.

Influenced by extreme heat during the calcining operation, this additive sets up stresses within each MgO crystal which cause the crystal to send out uneven projections of itself. These projections interlock with similar projections of adjacent crystals. No melting occurs, no liquids are formed. The result is a recrystallized homogeneous mass of MgO crystals tightly interlocked into a highly refractory Periclase grain of highest density and lowest porosity . . . ideal for the most severe refractory applications!

* * *

The foregoing discussion, although greatly simplified, points out the principal differences between magnesite and Kaiser Periclase. The magnesite bond, formed from impurities carried in natural ore and by added fluxing agents, is weak at use temperatures and unable to withstand the effects of high temperatures and chemical attack. Kaiser Periclase, being synthesized from high-purity MgO, permits the bond to be pre-determined and controlled. The resulting highly refractory crystalline bond is stable and can resist chemical attack almost to the same degree as the MgO crystal itself.

Kaiser Chemicals refractory specialists, backed by more than 15 years of continuous research and development, are producing special refractory compositions that assure open hearth and electric furnace operators peak performance in specific applications. These products are available for fast delivery to all parts of the United States from plants at Natividad and Moss Landing, California, and Columbiana, Ohio.

If you have a problem in your mill that might be solved by the prompt delivery of superior quality, dependable basic refractories, a Kaiser Chemicals field representative will be pleased to give you detailed information and immediate engineering assistance.

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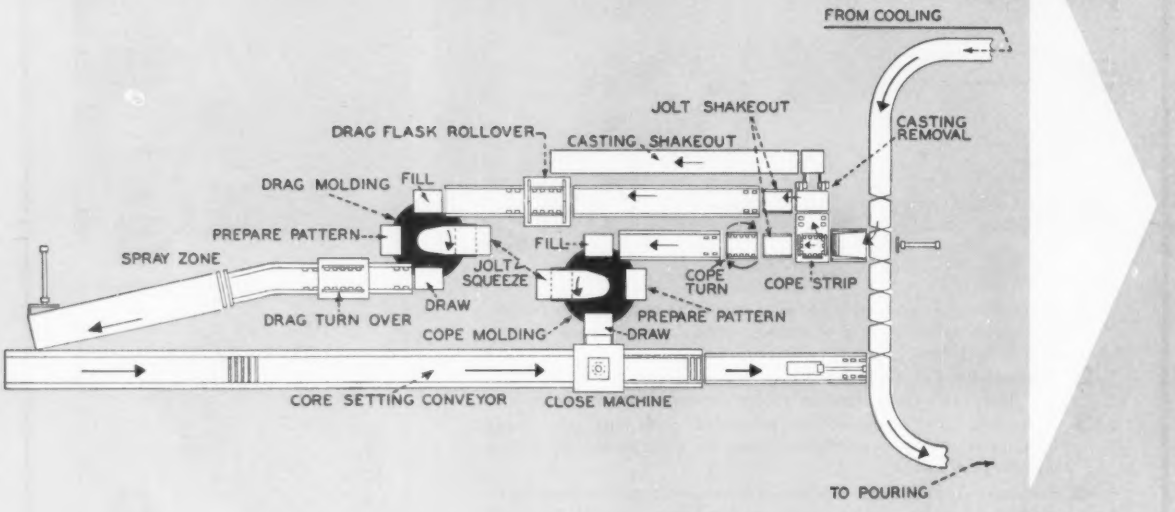
Pontiac's Automated Foundry Line



Casts 150 Engine Blocks an Hour

Automated line at Pontiac's foundry is built around two indexable molding machines. Twenty men are doing the work that took 68 on block molding operations

INDEXABLE machines mold, close flasks, and shake out 2400 V-8 engine block castings a day in the foundry at GM's Pontiac Motor Div., Pontiac, Mich. Manual handling of flasks is passe.

Observers maintain constant control of all phases of the system through a master panel. Maintenance men check and correct reasons for minor stoppages. Workers are needed only to set chaplets and cores, and to pour, spray the drags, and hang blocks on the cooling conveyor.

Operations are interlocked by electrical and pneumatic controls that may be preset for cycle time and production. Pusher cylinders and conveyors move the heavy flasks (they weigh about 2100 lb each when filled).

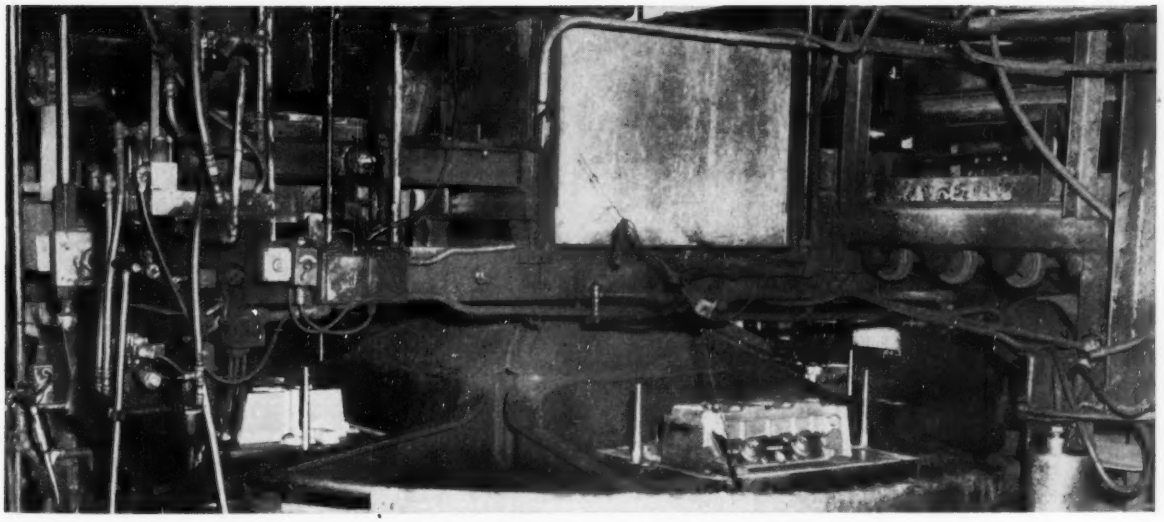
Equipment—The system has two four-station molding machines, one for making copes and a similar one for making drags. Built by Osborn Mfg. Co., Cleveland, they operate alike, but require slightly different setups and auxiliary equipment; the cope is deeper than the drag, and the drag has to be rolled over to bring it face up.

Each machine has an indexing mechanism that carries the patterns and molds from station to station.

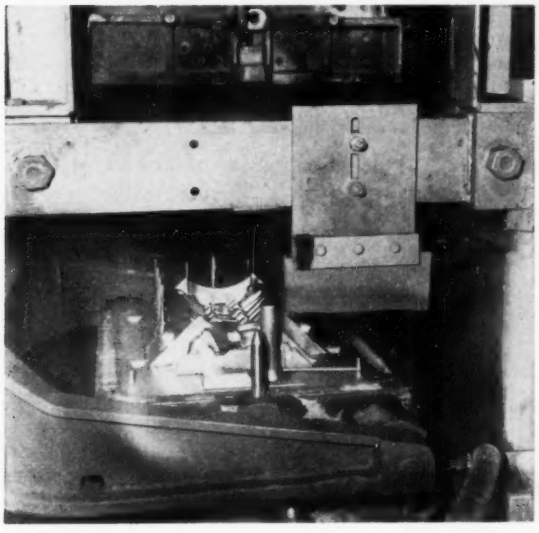
Sequence of Operation — Work begins at the drag molding machine. The metal pattern is blown off by an air jet and sprayed with a parting lubricant at the make-ready station. It is done while the conveyor moves the drag flask into the filling station.

When indexing is complete, the pattern is elevated. In moving upward inside the drag flask, the pattern picks up the flask and makes it ready for filling. A slight upward motion opens the sand hopper gates and releases a predetermined amount of sand. The pattern (with the flask still in place) is lowered to the indexing mechanism.

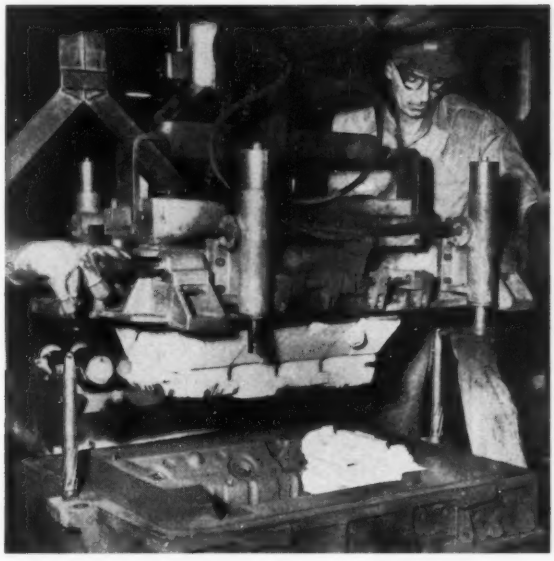
Stripping Station—Jolting and squeezing take place at the third station, with the mold and floating pattern plates free of the indexing mechanism. The flask is indexed to the draw station, while



The No. 4921 Osborn molding machine, a four-station indexing unit, fills the flask and jolts, squeezes, and draws the mold



The pattern is removed at the fourth station



Core setting fixture is manually brought into position over drag mold. Guide pins insure perfect setting of cores

another flask is being filled and another pattern prepared at stations one and two.

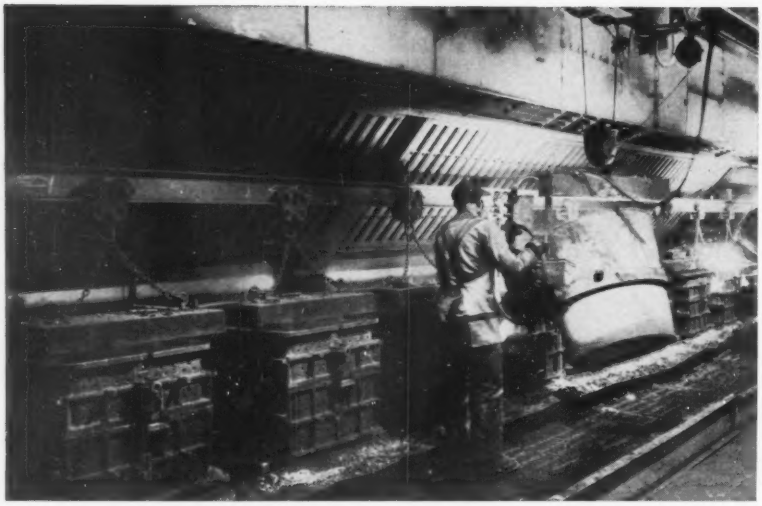
At the stripping station, the mold and pattern are raised. The mold is drawn on rollers; the draw piston descends; and the pattern is returned to rest on the indexing cradle arms.

The drag mold is ejected onto a conveyor and moved to a turnover station. Rotated through 180 degrees, bringing it face up, the mold is moved off onto a conveyor for the next operation, which is spraying with a quick drying graphite solution.

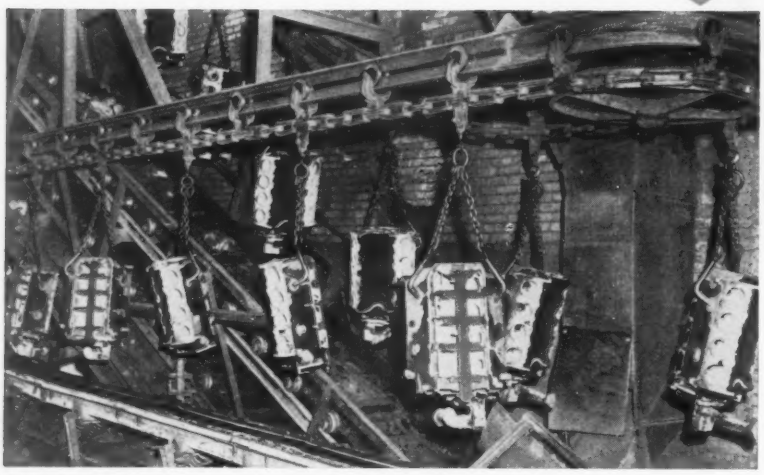
Cores Are Added—After spraying, the drag molds are pushed onto the coring conveyor. The seven cores which are to be set are preassembled and set into a fixture on a conveyor which carries them to the setting station.

They are removed from the conveyor manually in a core setting fixture which lifts the cores as a unit and positions them in the drag. The entire core assembly is set accurately in a few seconds.

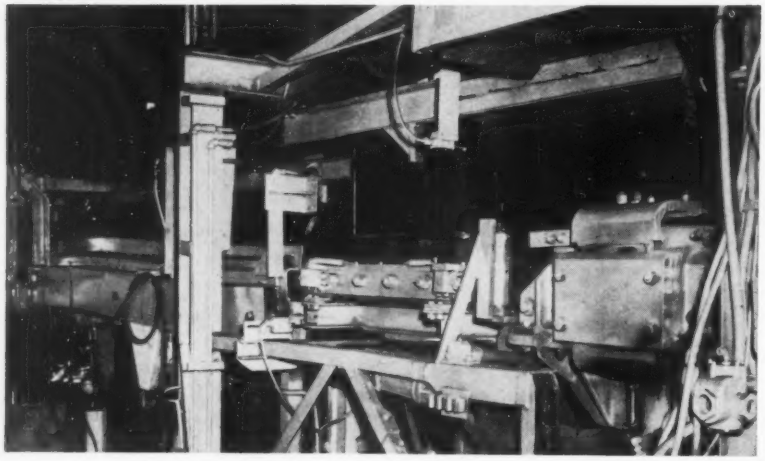
Cope Molds — Meanwhile, the cope is being processed on a similar molding machine. Copes are made in the same way as the drags. At the fourth station, withdrawal of the pattern leaves



Completed molds (about 2100 lb each) are poured on a conveyor



Hot V-8 blocks are carried to cooling tower by overhead conveyor



Flasks move through a jolt-shakeout system and return to molding machine after the sand and casting have been removed

the cope in a raised position. The cope is moved into the closing machine and positioned directly above the drag. The closed mold is moved onto a conveyor which carries it to the pouring area.

After pouring, the molds continue on the conveyor for a required cooling time before they arrive at the mold shakeout area. Castings are removed, flasks emptied, and the cope and drag halves conveyed back to the two molding machines.

Automatic Handling—The handling equipment, although not a part of the molding machines, is integrated and synchronized so that flasks approach and enter the machines at proper intervals, and mold halves are handled out of the machines when ready for transfer.

Indexing and transfers are done pneumatically and hydraulically in response to solenoid valves, most of which are actuated by the master timer.

The sand supply also is handled automatically. Sand from the shakeout is checked by probes, and the correct amounts of water and bonding material are added automatically in the muller. After mulling, conveyors deliver the sand to the molding machine hoppers.

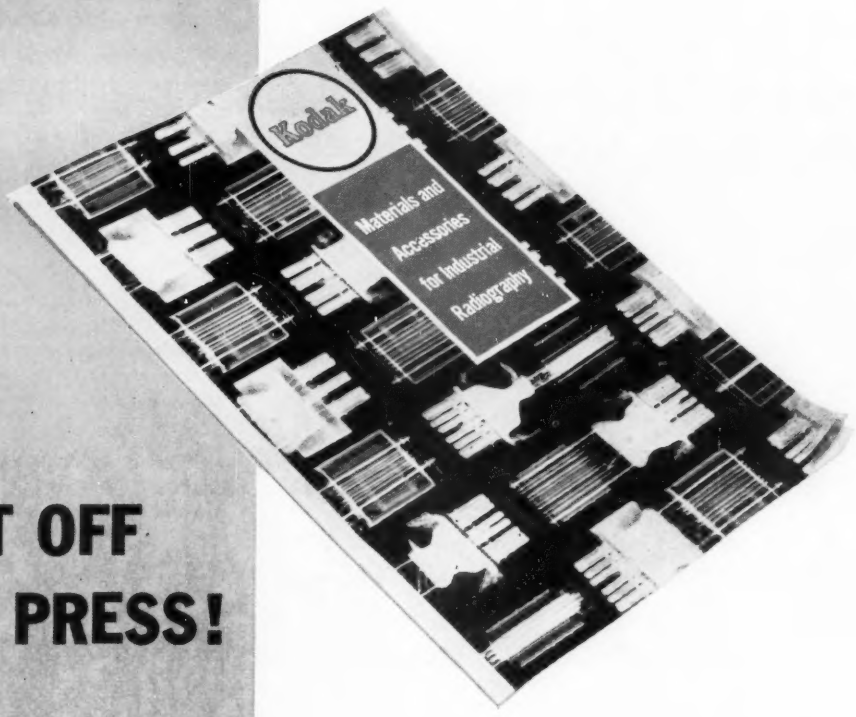
Maintenance—A preventive maintenance program for the automatic foundry unit has been one of the principal reasons for its success. A four-man crew is available during each of the two shifts the unit operates.

During the third shift, when the unit is closed down, a crew cleans, checks, and repairs all key operations and machinery units.

Coremaking—Pontiac has realized additional economies in coremaking. Eleven Osborn coremaking machines handle the load. One can turn out 360 barrel and crankshaft cores an hour.

The five-station machines blow and draw the core boxes on a preset time cycle. Cores are baked, assembled, and loaded on conveyors for delivery to the molding line.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*



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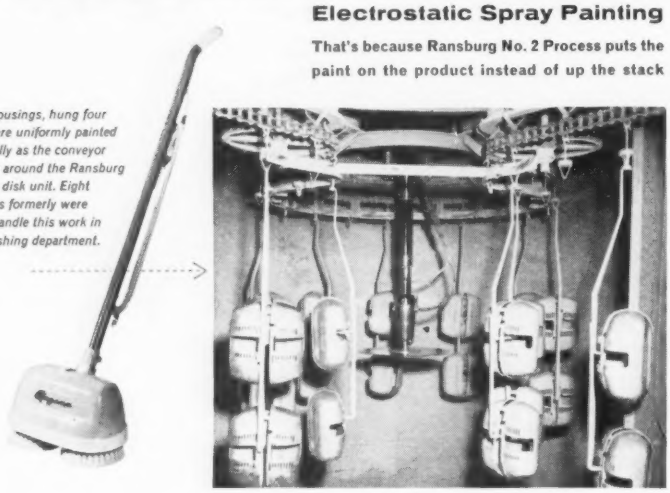
Aluminum housings, hung four to a fixture, are uniformly painted electrostatically as the conveyor makes a loop around the Ransburg reciprocating disk unit. Eight hand sprayers formerly were required to handle this work in Regina's finishing department.



The Regina Corporation, Rahway, N. J., replaced hand spray with Ransburg No. 2 Process to paint their twin-brush Floor Polisher and Scrubber, and their Electrikbroom.

Now, a single reciprocating disk unit automatically handles the work which formerly required eight hand sprayers. Even with increased production, Regina is using 50% less paint. Quality of the work is improved with maximum uniformity on all parts.

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RANSBURG

Foundry Tool Mixes Ore

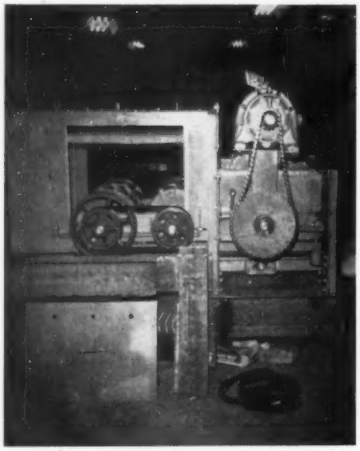
Taconite plants use conveyor belt mixer to process sticky, abrasive concentrates

A COMPANY doing business with one industry does well to search for markets in entirely different fields. A case in point is the Pekay Machine & Engineering Co. Inc., Chicago.

Pekay makes what it calls a Mixer-Muller, widely used in the foundry industry for conditioning molding sand. The infant taconite industry has opened a new future for the machine.

Concentrate Mixing — Late in 1955, the Erie Mining Co., setting up its preliminary taconite plant at Aurora, Minn., found itself with no successful way of mixing bentonite and sea coal with the ore concentrate. After a year of experimentation, the Mixer-Muller has become standard equipment for mixing ore, coal, and bentonite for balling drums at Erie Mining Co.'s Hoyt Lake, Minn., plant. Taconite processing plants of Bethlehem Cornwall Corp., Hilton Mines Co., and Cleveland-Cliffs Iron Co. also are using the machine.

The taconite concentrate, which weighs 125 lb per cu ft, is tacky and abrasive. The mixers handle it in a continuous operation, receiving it from and discharging it to a conveyor belt. The units cost $4000 to $8000.

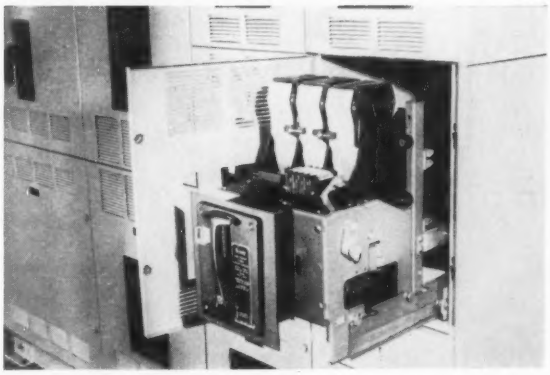


Pekay Mixer-Muller installed in conveyor line at Erie Mining Co.'s Hoyt Lake, Minn., taconite beneficiating plant

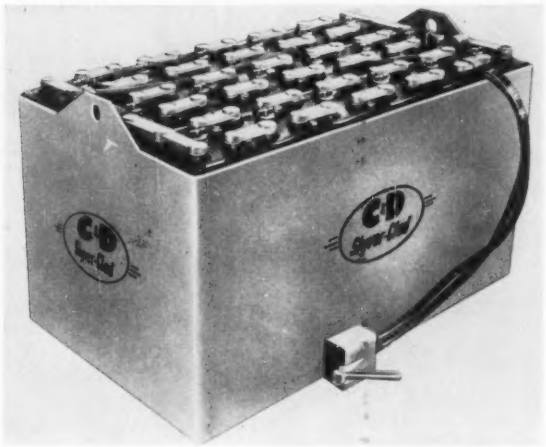
Low Voltage Power Equipment Has Quick-Make Manual Closure

The K line of circuit breakers consists of 600-volt units in 225, 600 and 1600 ampere frame sizes. Life of contacts and of the breaker is extended by eliminating arcing damage resulting from careless closure by hand.

The K line switchgear uses closed door drawout for the circuit breakers. They can be moved from operating to test and disconnect positions within their enclosure without opening switchgear cabinet doors. Unitized construction reduces the switchgear to three basic components—the breaker, the enclosure, and a cradle assembly on which the breaker slides for drawout. *Write*: Switchgear Div., I-T-E Circuit Breaker Co., Philadelphia, Pa. *Phone*: Locust 7-1420



Batteries for Electric Trucks Have High Capacities



Type HC and CMS batteries provide increased power within standard battery dimensions. Battery sediment space is reduced to a minimum (allowing the use of long plates) by wrapping positive plates for maximum insulation and minimum shedding.

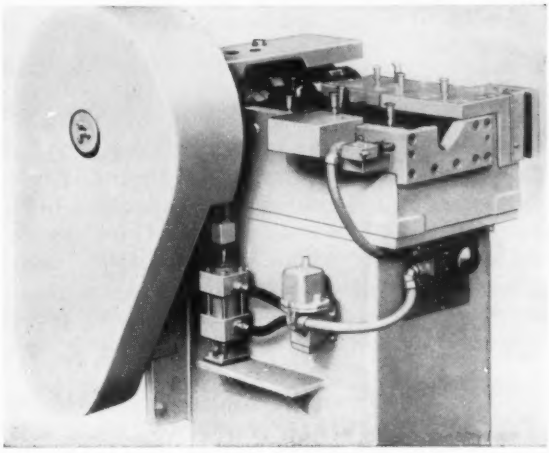
The HC battery has a rated capacity of 72 ampere hours per positive plate, yet has the same outside dimensions as the industry's former standard of 60 ampere hours per positive plate. Discharge rate is 6 hours. Positive plates are 0.255 in. thick and 16 7/16 in. long.

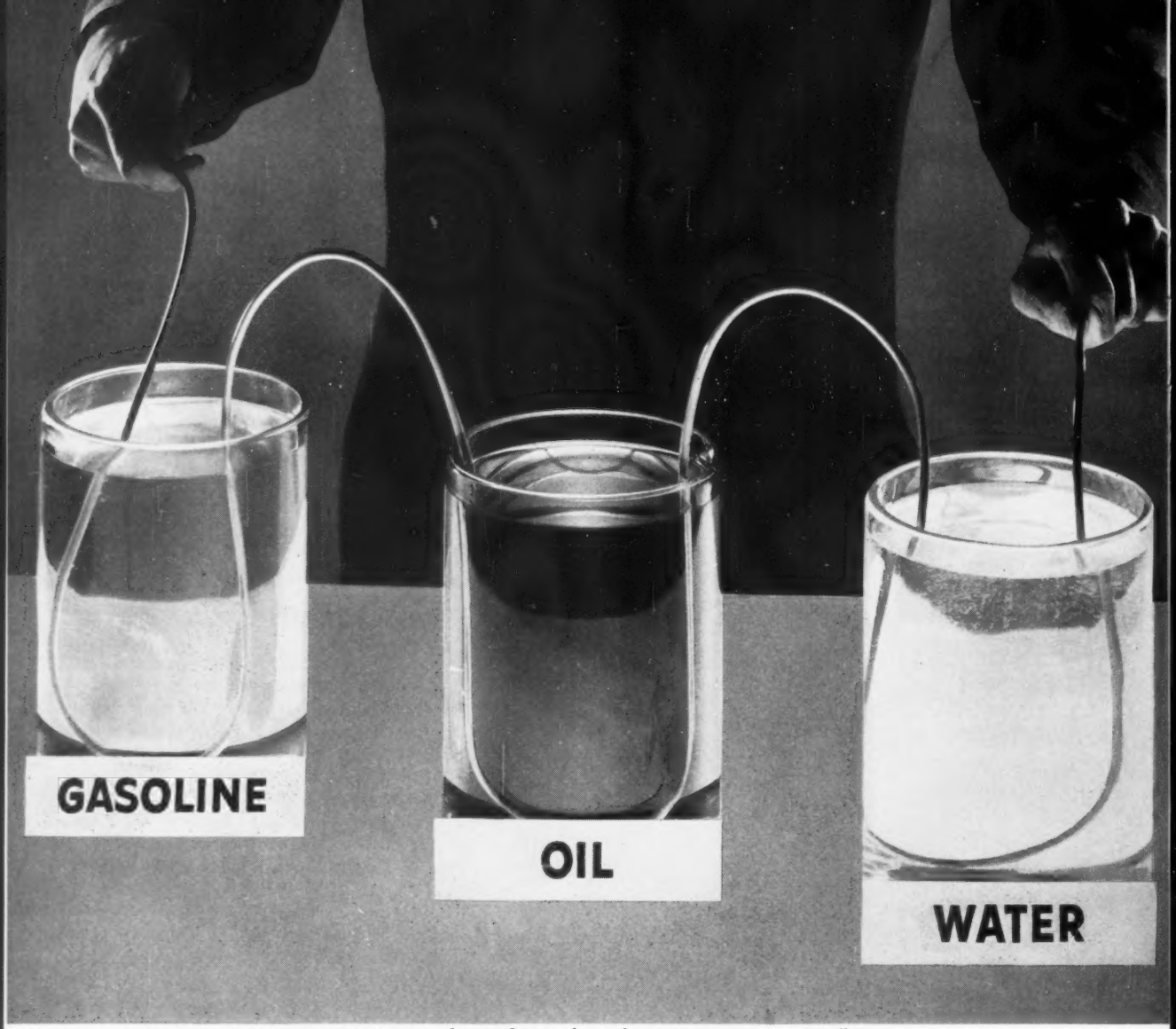
The CMS battery has a rated capacity of 55 ampere hours per positive plate at the 6-hour rate. It is used with low sit-down fork trucks (center control types) with collapsed mast heights of about 72 in. *Write*: C & D Batteries Inc., Washington and Cherry Streets, Conshohocken, Pa. *Phone*: Taylor 8-1140

High-Speed Tube Machine Produces Double Flares

A motor driven mechanical press and a mechanical punch-shifting and tube-clamping mechanism make up this machine. It produces a double flare on steel or nonferrous tubing at a single tube position. Tube capacity of the machine is ½ in. OD x 0.035 in. for steel and up to ⅝ in. OD for copper, brass, or aluminum tubing. Maximum output: 90 flares a minute.

Operation cycle: When the clutch is engaged, the tubing is gripped by two steel dies. There are two punches. The bulging punch first strikes at the end of the tubing. The punches automatically retract and shift position laterally. Next, the flaring punch strikes the end of the tubing. The two dies then reopen, completing the cycle, and the clutch is disengaged by the antirepeat mechanism. *Write*: Automation Associates Inc., 1444 E. 11 Mile Rd., Madison Heights, Mich. *Phone*: Lincoln 1-8013





DENTROL WIRE—submerged in gasoline, oil, water—proves resistant to all 3.

New Dentrol thermoplastic wire RESISTS ALL 3—GASOLINE, OIL, WATER!

Dentrol wire affords *new safety* wherever wiring is exposed to gasoline or oil—*new economy* over the lead-covered cable you're now using in these areas.

Made with a clear nylon jacket over-all, Dentrol not only beats gasoline, oil and moisture—but is exceptionally resistant to abrasion. It is easily installed (hard, smooth finish makes pulling through conduit simple), easily stripped, lightweight for easy handling.

Suggested uses: for 600 volt wiring for lighting, power and control in and around service stations, refineries, tank farms, and industrial plants.

Dentrol is Underwriters' Laboratories approved as TW and "gasoline-resistant" wire for use in open raceways where exposed to gasoline or gasoline vapors. Thus it meets the provisions of section 5023 of the 1956 National Electrical Code, concerned with installations in hazardous locations.

Available in colors, and in 500′ cartons. See your Anaconda distributor. For information write: Anaconda Wire & Cable Company, 25 Broadway, N. Y. 4, N. Y.

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FOR **DENTROL WIRE**

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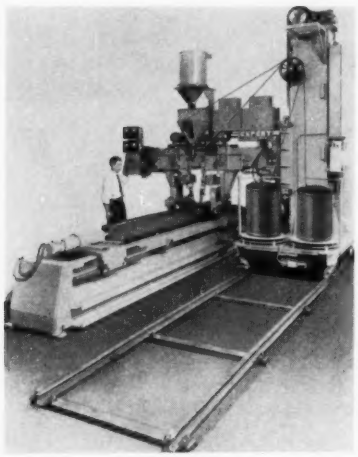
Welding Machine

This twin arc welding machine performs controlled welding operations on both sides of large production parts. It is a submerged arc machine that welds at the rate of 80 ipm.

The machine illustrated makes four reinforcement welds along the edges of both sides of a beam 12 ft long. Its cross section is 8 x 8 in.



The part is squared by a mechanism located in the center of the machine. Fixtures on each end of the bed both center and clamp the part in position. They also turn the part over. *Write*: Expert Welding Machine Co., 17144 Mt. Elliott Ave., Detroit 12 Mich. *Phone*: Twinbrook 1-4327

Granite Riser Blocks

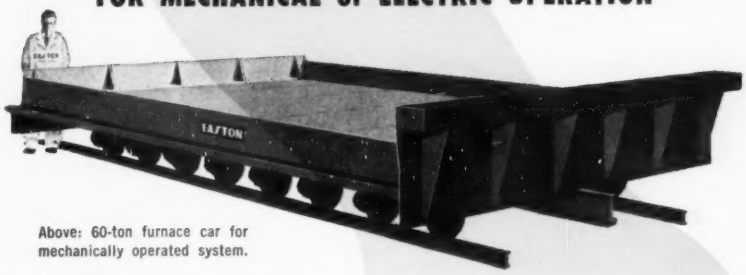
These riser blocks provide an accurate surface parallel to the working surface plate at an elevation that allows the use of standard height gages. This eliminates erroneous readings caused by vibration or chatter often encountered with extralength height gages.

The touch of a finger will guide the block into position. The block floats on a cushion of air. There is no wear on the surface plate or the block itself while it is being moved.

Air at about 40 psi is piped into a hole in the back of the block and led to a series of grooves on the bottom surface. The grooves

Furnace Cars

FOR MECHANICAL or ELECTRIC OPERATION



Above: 60-ton furnace car for mechanically operated system.

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Write or telephone for technical information.

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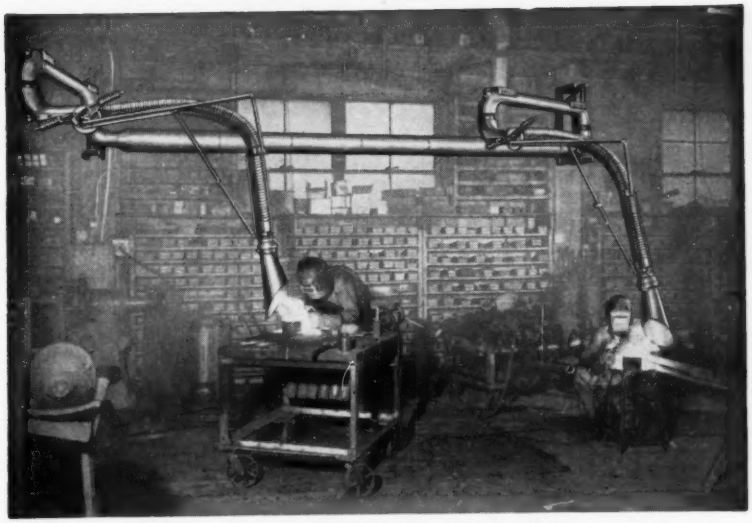

Keep Plant Air CLEAR of Welding Fumes

Welding shops equipped with Ruemelin Fume Collectors are assured of a clean, healthful atmosphere. Harmful fumes, heat and smoke are eliminated *at their source*, before they have a chance to spread throughout the shop. This lessens fatigue . . . improves working conditions . . . paves the way for increased plant production. Ruemelin Fume Collectors are approved by Industrial Commissions and insurance companies. Thousands in service. Available with 9 ft., 15 ft., 17 ft. and 20 ft. reach. Write for Bulletin No. 37-E.

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3882 NORTH PALMER STREET • MILWAUKEE 12, WISCONSIN, U. S. A.

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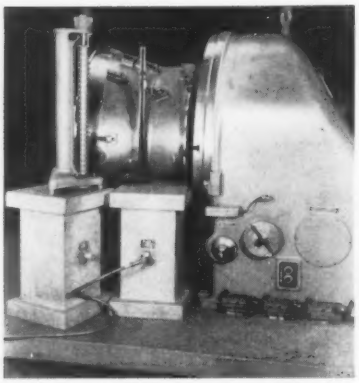


are cut to within two inches of the edges, so that if the block is moved too close to the side of the surface plate the air will escape. This safety feature prevents the block from "floating off" the surface plate.

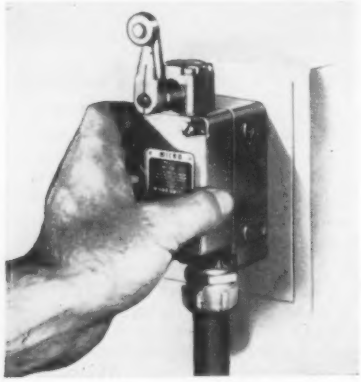
When the block has been positioned, the operator shuts off the air supply.

Blocks are also available in square and cylindrical shapes. Top and bottom surfaces are flat to a maximum reading of 0.000050 in. and parallel within 0.000075 in. *Write*: Herman Stone Co., 1860 N. Gettysburg Ave., Dayton, Ohio.

Switch Plugs In

The Plug-In Limit is a precision limit switch which can be replaced almost immediately should the need arise.

The unit consists of two parts—a terminal block enclosure containing the wiring connections to the outside line, and a switch enclosure that includes all moving mechanical and electrical parts.



The switch enclosure is fitted with four current-carrying spring plugs integrally molded to the basic switching element, and the terminal block with four corresponding receptacles. When plugged together, they form a complete switching unit.

Wiring connections are made to the sealed terminal block enclosure which is permanently mounted on the machine.

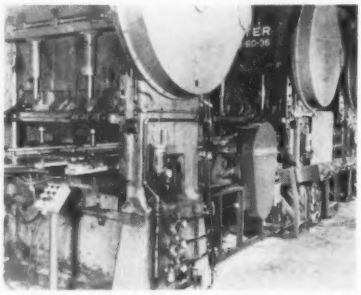
The switch enclosure is plugged onto this block, precisely positioned by dowel pins, and held by two screws.

Actuating arms may be preset to eliminate on-the-job adjustment.

The switch also offers complete adjustability of actuation and versatility of mounting. *Write*: Micro Switch, division of Minneapolis-Honeywell Regulator Co., Freeport, Ill.

Press Automation

The Press Pacer is a transfer unit which can convert standard stamping presses into fully automated transfer lines up to 60 ft long.



The transfer unit can be used with both straight-side and gap-frame presses. It is portable, easy to install, and can be disassembled in minutes.

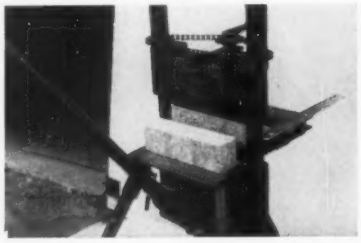
The unit is situated between presses. Aluminum transfer rails with retractable pickup fingers move back and forth to carry stampings from one press to another. Transfer distance can be adjusted from 8 in. to 3 ft or more.

Pickup fingers are interchangeable to accommodate a wide range of stampings in different shapes and sizes. Presses are tripped by the pickup fingers as they are retracted.

Two cams driven by an electric motor in the unit's base produce the reciprocating motion of the transfer rails. *Write*: Contract Mfg. Div., Sheffield Corp., Dayton 1, Ohio. *Phone*: Kenmore 3131

Refractory Cutter

This portable masonry splitter saves time in shaping refractories to size. It makes a sharp, sawlike break.



The hand-operated splitter eliminates the hazards of flying dust and fragments.

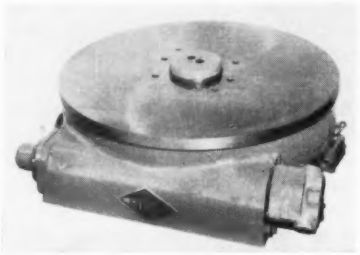
The splitter has a breaking pressure of over 50,000 lb. *Write*: E & R Mfg. Co., Rochester, Ind.

Index Table

Model GEM-26 will index parts weighing up to 2000 lb. The table has a diameter of 26 in. and may be equipped with as many as 12 stations.

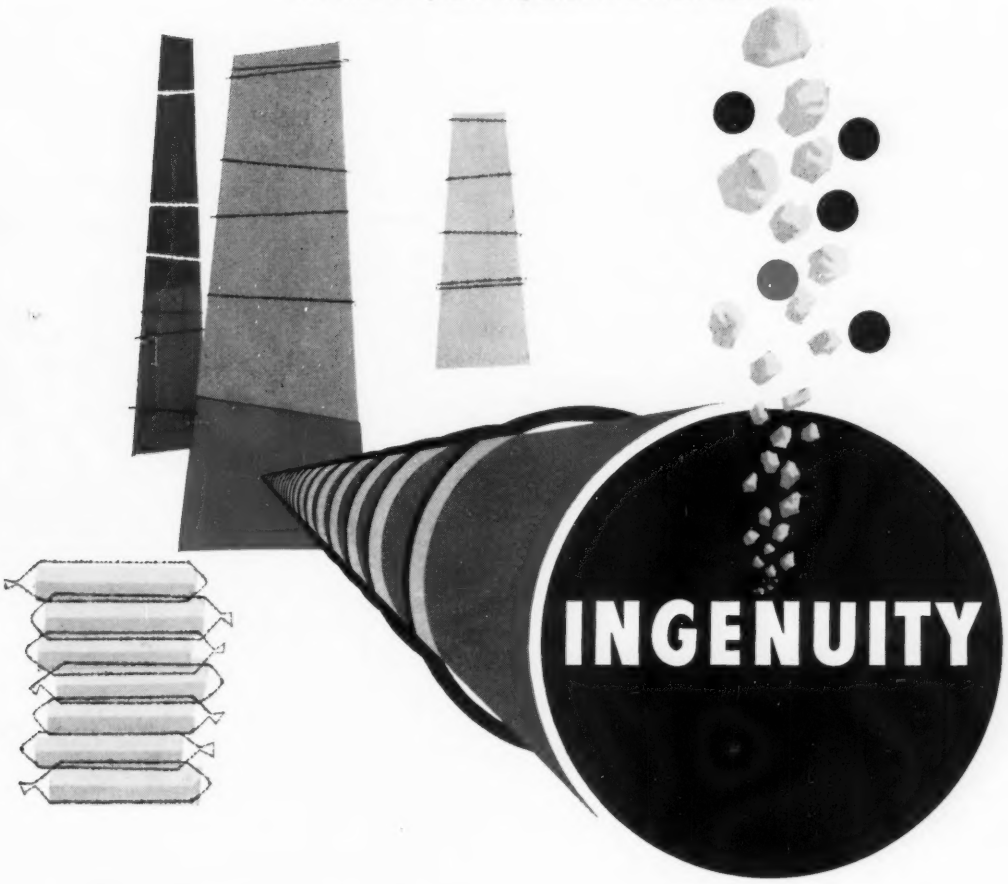
The table will index to $\pm$ 0.001 in. on a 24-in. diameter work circle, with true Geneva motion. Workpieces are positioned smoothly and quickly, in as little as 2/3 second.

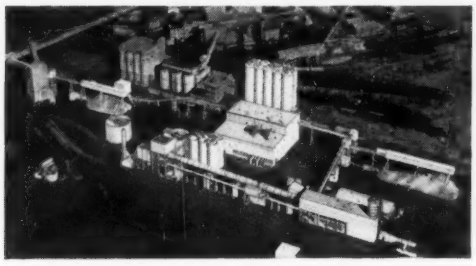
The table is used to automate drilling, tapping, chamfering, and welding machines, gaging devices, and other high volume operations.



Standard equipment: Rotary air motor, solenoid valve, limit switch. *Write*: Gray Equipment Co., 13600 Ford Rd., Dearborn, Mich. *Phone*: Tiffany 6-7573

call KE for plant expansion or new facilities





1,250,000 barrel cement plant addition recently completed by KE for Marquette Cement, one of world's largest cement producers.

has made KE a major engineer-contractor serving the Minerals Industry

Placing of four fully-lined mills in a few hours instead of days—a unique center pier kiln drive —a 2,700' cement transport "airway." With these and many more planned innovations and short-cuts, Kaiser Engineers completed Marquette Cement's Cape Girardeau plant expansion quickly and economically. Construction cost and time were well below industry average.

Mining, transportation, beneficiation, materials handling, processing in cement, gypsum, coal, ferrous and non-ferrous metals facilities—these are but a few of the fields wherein KE serves the Minerals Industries—from economic analysis through start-up.

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NEW literature

Write directly to the company for a copy

Clutches

Bulletin 501, 4 pages, describes electromagnetic disc clutches for use on ball mills, rod mills, and kilns. Stearns Electric Corp., 120 N. Broadway, Milwaukee 2, Wis.

Aircraft Fasteners

Bulletin 8-411, 16 pages, describes the line of Huckbolt fasteners and stumps, their properties, installation, and inspection. Huck Mfg. Co., 2480 Bellevue Ave., Detroit 7, Mich.

Dust Collectors

Long cone collectors are dimensioned and described in Bulletin 150-A, 4 pages. Sprout, Waldron & Co. Inc., Muncy, Pa.

Fork Truck

This 4-page bulletin describes an electric-powered fork truck with a capacity of 2000 lb. Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, Ohio.

Taps

This 20-page booklet tells how specific taps for tough steels, cast iron, aluminum, zinc, or brass give better performance. Detroit Tap & Tool Co., 8615 E. Eight Mile Rd., Warren, Mich.

Alloy Temperature Chart

This chart indicates the temperature range of alloys and their usefulness in carburizing and nitriding, reducing atmospheres, and oxidation. Rolled Alloys Inc., 4815 Bellevue Ave., Detroit 7, Mich.

Refractories

Bulletin 324, 24 pages, gives detailed information on castables, cements, ramming mixes, and patches. Chas. Taylor Sons Co., Cincinnati, Ohio.

Corrosion Prevention

This chart presents data on 20 military-specification corrosion preventives, including solvent cutbacks, petrolatum barriers, general purpose preservatives, and engine preservation lubricants. Pennsylvania Refining Co., Butler, Pa.

Nuclear Stainless

This 4-page bulletin discusses the use of stainless steel and special purpose alloy tubing and pipe in nuclear energy applications. Alloy Tube Div., Carpenter Steel Co., Union, N. J.

Recording Systems

This 16-page bulletin contains descriptions and specifications of oscillographic recording systems and a line of accessories and unit instruments. Industrial Div., Sanborn Co., 175 Wyman St., Waltham 54, Mass.

Industrial Flooring

Bulletin 655, 4 pages, tells how to use emery aggregate in new floors and in resurfacing or patching old ones. Walter Maguire Co. Inc., 60 E. 42nd St., New York, N. Y.

Iron and Steel Castings

Physical properties and chemical compositions of iron and steel castings are covered in this 16-page bulletin. Howard Foundry Co., 1700 N. Kostner Ave., Chicago 39, Ill.

Grinding Spindles

This 8-page bulletin describes a line of spindles for grinders and boring machines. Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.

High Strength Steels

Structural steels with yield strengths over 200,000 psi are described in this 16-page bulletin. Composition, properties, and technical data are presented for all grades. End uses are described. Climax Molybdenum Co., 500 Fifth Ave., New York 36, N. Y.

Dispersions

Uses and properties of colloidal graphite, molybdenum disulfide, mica, glass, copper, and custom dispersions are described in a 4-page bulletin. Acheson Colloids Co., Port Huron, Mich.

Flexible Couplings

Shaft couplings used where units are spaced far apart and one bearing is provided for only one of the units are covered in Bulletin 99, 4 pages. Thomas Flexible Coupling Co., Warren, Pa.

Adjustable Ramps

A line of adjustable ramps (with capacities from 10,000 to 20,000 lb) for loading docks is described in this 8-page bulletin. Rowe Methods Inc., 2534 Detroit Ave., Cleveland 13, Ohio.

Filter Powder

Bulletin 28, 3 pages, describes an insoluble cellulose fiber that is compatible with brighteners and never causes roughness in copper, other cyanide-type, or bright nickel solutions. MacDermid Inc., Waterbury, Conn.

Cold Friction Saw

This 4-page bulletin describes a saw for cutting beams, columns, and angles. Wilmington Plant, United Engineering & Foundry Co., Wilmington 99, Del.

Seam Welding

Bulletin SP-7A, 16 pages, details seam welding from material preparation to weld testing. Taylor-Winfield Corp., Warren, Ohio.

Curtain Walls

Porcelain enamel on steel and aluminum curtain walls and veneer panels are described in this 8-page bulletin. Ingram-Richardson Mfg. Co., Beaver Falls, Pa.

Aluminum Sheet

Properties and uses of each of the aluminum sheet alloys are discussed in this 28-page bulletin. Revere Copper & Brass Inc., 230 Park Ave., New York 17, N. Y.

Adjustable Speed Drives

Bulletin GEA-6643, 16 pages, describes a line of direct current drives from 3 to 150 hp. A slide rule is included which calculates case dimensions, horsepower, speed range, power unit weight, and motor frame size. General Electric Co., Schenectady 5, N. Y.

Stainless Pipe

This chart, TDC-188, lists the analysis and comparative price ratios of 33 seamless stainless grades. Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa.

Instrument Switches

Advantages and construction of instrument and control switches rated for 20-ampere continuous capacity with 600-volt insulation are described in Bulletin 14B8112A, 8 pages. Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Stainless Steel Fasteners

This 12-page bulletin covers aircraft bolts, slotted and Phillips machine screws, flat and round rivets, and washers. Allmetal Screw Products Co. Inc., 821 Stewart Ave., Garden City, N. Y.

FILMS AVAILABLE

"Steel Valley" is an 18-minute movie showing how the lighter, tougher superalloy steels and reactive metals are made and used. Public Relations Dept., Sharon Steel Corp., Sharon, Pa.

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From coil to coil and heat to heat, you can rely on the uniformity of Crucible Stainless steel strip—in flatness, in finish, and in metallurgical quality. And Crucible's full integration from raw material to final delivery is your assurance of prompt, dependable service as well. For these two reasons, it pays to call Crucible whenever you need stainless strip. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

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STEEL

December 2, 1957

Market Outlook

RESIGNED to sluggish buying during the remaining weeks of this year, leading steelmakers are sizing up market prospects for 1958. What they see is mildly encouraging, especially in light of the slow markets of recent weeks.

They expect the current economic adjustment to continue. But they think finished steel use will hold close to 1957 volume, around 85 million tons. They expect ingot output to slip no more than 5 per cent below this year's estimated 114 million tons.

SIDEWISE MOVEMENT—Current steel business continues on a plateau. Buying for December delivery is hand to mouth, and the pace of specifying is likely to slow down as the holidays approach.

As a result, this month's volume will likely fall appreciably under that of November—and business that month certainly wasn't up to seasonal expectations.

FORWARD BUYING—Despite current dullness, sellers are encouraged by a slight improvement in consumer interest in first quarter (1958) requirements. It is particularly noticeable in sheets and strip.

Many users that have been ordering sparingly the last several months, now appear to be more concerned about their early first quarter needs.

RISING ACTIVITY—Growing production of automobiles continues to spark hope of an early pickup in orders for steel. So far, the improvement in autos has not meant much.

Latest reports show auto output running about 30 per cent better than it did a year ago. Figures for the latest week place output above 154,000 cars for the first time since late in December last year.

INVENTORIES SHRINKING—Consumers' stocks of steel products are being reduced steadily. But evidence is accumulating to indicate some users have reduced inventories about as far as they can; they are depending more and more on prompt mill shipments. Automotive inventories are estimated at around 18 days and are believed rising.

Extension of the short position on stocks could catch some consumers off base in some products should demand take a sudden spurt—a possibility in light of rising agitation for stepped up production of missiles and other defense items.

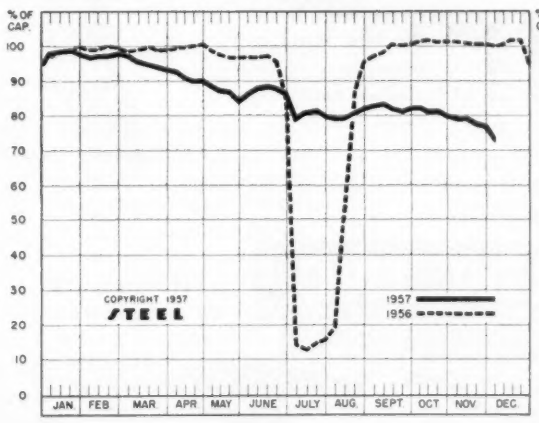
PRODUCTION—Reflecting continued sluggish demand, steelmaking operations dropped sharply last week, falling 3 percentage points to 73.5 per cent of ingot capacity. It was the slowest production pace, except for strike and holiday periods, since 1954.

Output for the week is estimated at about 1,880,000 net tons. That compares with the all-time high of 2,525,000 tons in the week ended Dec. 23 last year.

PRICES—The decline in scrap prices was resumed last week, following a week of relative stability. STEEL's composite on No. 1 heavy melting steel slipped another 17 cents, and at $33 is at a new low since December, 1954.

Other price indexes are unchanged, with STEEL's arithmetical average on finished steel products holding at $146.03.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Dec. 1	Change	Same 1956	Week 1955
Pittsburgh	74.5	— 5.5*	96.5	99
Chicago	76	— 1.5*	100.5	97.5
Mid-Atlantic	82	— 0.5	101	99
Youngstown	71	+ 1	101	100
Wheeling	61	— 3	102	102
Cleveland	71	— 0.5*	106.5	96
Buffalo	78	— 5	107.5	80
Birmingham	63.5	+ 3	94.5	94
New England	53	0	80	88
Cincinnati	81.5	— 4.5	95.5	92.5
St. Louis	87.5	— 1.5	102.5	101.5
Detroit	88.5	— 3.5*	102	100.5
Western	86	0	105	103
National Rate	73.5	— 3	100	100

INGOT PRODUCTION‡

	Week Ended Dec. 1	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	117.3†	121.1	127.1	154.9
NET TONS (In thousands)	1,884†	1,945	2,041	2,489

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—Page 47

Technical Outlook—Page 93

Do you need HIGH STRENGTH - MACHINABILITY - MINIMUM DISTORTION?

Specify BL Strain-TEMPERED STEEL

Bliss & Laughlin Strain-Tempered* Cold Finished Bar Steels provide any or all of these material characteristics with suitable modifications to best meet your specific requirements.

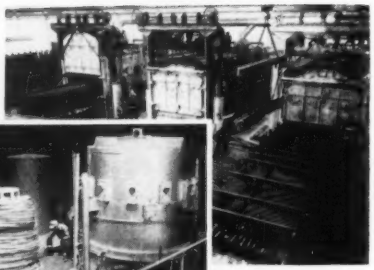
Designed to speed up your production, save heat treating operations and reduce fabricating difficulties, Strain-Tempered Steel also offers you opportunity for an improvement in part service quality, and a saving in material costs.

Perhaps you are now paying a price premium for extra properties which you may not need or want. When you buy B&L Strain-Tempered Steel you get a product tailored to your job. By eliminating extra charges for unneeded qualities you ensure lowest unit part costs.

ADDED ECONOMIES

are now available to you in ordering Strain-Tempered Bar Steels. Get in touch with us at once, and let B&L sales engineers show you these new savings.

Complete modern facilities for handling Strain Tempered Steel Bars & Coil Stock.



Our latest Bulletin gives further details on Strain-Tempered Bars. Ask for Bulletin #55.

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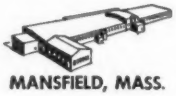


MANSFIELD, MASS.

Nonferrous Casting Shipments

(Tons)

	BRASS-BRONZE	ALUMINUM	MAGNESIUM
1957*	425,000	390,000	16,700
1956	483,153	397,291	18,084
1955	504,449	413,581	13,927
1954	417,965	312,486	12,889
1953	495,248	329,011	17,259
1952	504,955	259,489	17,429
1951	588,771	275,216	16,567
1950	528,486	271,541	7,612

Source: Bureau of the Census.
*Estimated by STEEL.

Foundries Feel the Pinch

NONFERROUS foundries seem to be in the same boat as producers of gray iron, malleable, and steel castings. They're shipping smaller tonnages than they did last year and watching backlogs decline.

At the end of August, shipments of brass and bronze castings were 13 per cent behind last year's level; backlogs were down 30 per cent. Magnesium castings showed a 6.5 per cent decline in shipments and a 25 per cent drop in unfilled orders. For aluminum castings, shipments were off 2 per cent, backlogs 20 per cent.

Less Consumption — Reduced shipments of brass and bronze castings can be attributed to smaller consumption by manufacturing and construction industries and slow inventory replacement. Orders from shipbuilders, industrial valvemakers, and pump manufacturers have been relatively good. Shipbuilders, having one of their best peacetime years, are ordering more manganese bronze propellers than ever before.

Volume has slipped in bearings, bushings, plumbing fixtures, valves, and fittings. The drop in shipments of magnesium castings is due mainly to defense cutbacks.

Higher Costs—Fluctuating costs of raw materials, red brass ingots, and scrap confuse the price picture. While ingot and scrap prices fall, the costs of labor, overhead, and freight continue to mount. Result: Foundries hold the line, despite falling metal prices.

Outlook for 1958—Automakers will increase their use of aluminum castings by 8 per cent in 1958, predicts Kaiser Aluminum Co. Greater tonnages will also be used in business machines and home appliances. Magnesium castings seem destined for better sales now that the government is pushing missile research.

Next year's consumption of aluminum diecastings will be about 205,000 tons, surpassing sand and permanent mold castings combined. Diecastings offer a wider range of applications than other types, particularly when large production runs are involved.

In the heavier aluminum alloy castings, the trend is toward the permanent mold process. Motor vehicles provide a market for 60 per cent of permanent mold castings. Home appliances take 10 per cent of the output, industrial-commercial equipment 8 per cent.

Of 3127 U. S. foundries that produce nonferrous castings exclusively, 2363 cast brass and bronze, 3111 cast aluminum, and 218 magnesium. There were 2895 exclusive nonferrous foundries in 1955.

More Expansion—Although capital expenditures for nonferrous foundry expansion have slowed, large investments are still being made. In the brass industry, Walworth Co. is building a $5-million-plus engineering and research center at Braintree, Mass. Ford Motor Co.'s Sheffield, Ala., plant is

They, Too, Produce Stainless . . .

Here are two additions to the list of stainless steel producers published on Pages 108 and 109 of the Nov. 4 STEEL.

Claymont plant, Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp. (Wilmington, Del.) is a producer of stainless clad plates.

Summerill Stainless Tube Div., Columbia Steel & Shafting Co. (Pittsburgh) is a producer of seamless pipe and tubing, mechanical and pressure pipe and tubing.

For an extra copy of the 16-page article containing the table of stainless steel producers, write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

working up to a daily output of 140 tons of permanent mold and diecast aluminum parts for engines and automatic transmissions. Chevrolet is building an aluminum foundry at Massena, N. Y.

Blast Furnace Output Up

Blast furnace production (pig iron, ferromanganese, and spiegeleisen) totaled 6,519,478 net tons in October, reports the American Iron & Steel Institute. This compares with 6,627,911 tons in September, and 7,315,559 in October last year.

Of total output in October, 6,454,450 tons were pig iron (September—6,569,074; October, 1956—7,245,650) and 65,028 tons ferromanganese and spiegeleisen (September—58,837; October, 1956—69,909).

Output in the first ten months this year was 68,280,112 net tons (67,632,845 pig iron and 647,267 ferromanganese and spiegeleisen). In the like period last year, it was 61,581,491 tons (61,041,605 pig iron and 539,886 ferromanganese).

BLAST FURNACE PRODUCTION—October, 1957
(Net Tons)
(Pig Iron, Ferromanganese & Spiegeleisen)

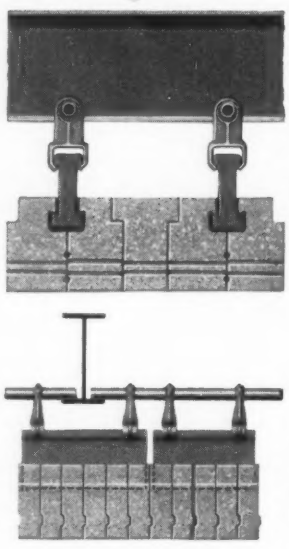
Districts	October 1957	October 1956	First Ten Months 1957	First Ten Months 1956
Eastern	1,524,799	1,574,265	14,796,591	12,942,686
Pittsburgh-Youngstown	2,069,052	2,550,197	22,871,063	21,521,926
Cleveland-Detroit	831,984	843,679	8,259,267	7,301,913
Chicago	1,280,670	1,457,557	13,702,797	12,429,827
Southern	474,739	521,576	5,294,449	4,176,778
Western	338,234	368,285	3,355,945	3,208,361
Totals	6,519,478	7,315,559	68,280,112	61,581,491

This tile is called a dog bone!

It's a husky supporting tile—used instead of an expensive alloy casting in a double suspended arch designed by B-L for high temperature aluminum, steel and glass furnaces. It can stand extremely high temperatures—can be used with or without insulation.

The dog bone supports the arch tile. Bottom lugs are sloped so that the weight of the arch tile will draw the two together. Filler tile space out the arch.

Naturally the completed arch will possess all of the inherent characteristics of Bigelow-Liptak suspended construction. Burned out or damaged tile can be removed without disturbing large areas. Expansion is confined to individual tile—will not accumulate over the entire width of the arch. It all adds up to more production—less down time through keeping heat from raising the roof.



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Tin Plate . . .

Tin Plate Prices, Page 149

American Can Co. has opened a facility at Milwaukee for processing tin plate for canmaking from 15,000-pound coils. The plant addition is the first of its kind in the North Central states, and is part of Canco's $27 million program to set up facilities for handling coils in strategic canning areas.

Plates . . .

Plate Prices, Page 147

Plate orders (excepting shipbuilding requirements) are off an estimated 15 per cent this quarter in the East. Several eastern Pennsylvania producers will become current on schedules by year-end, but at least two will have carryovers.

More fabricating shops are placing orders on 30-day leadtime, compared with 45 recently.

Tank and weldment volume is lower; consumers' steel inventories are larger. Electrical equipment demand is holding up, and substantial stainless clad volume is being estimated.

In general, plate fabricating shops are getting steel tonnage in the volume required, and deliveries are not too far extended.

The New York Shipbuilding Corp., Camden, N. J., has a contract for the first nuclear-powered merchant ship to be built. Its cost: $21 million. The keel will be laid next year. Babcock & Wilcox Co. has a contract ($9 million) to build the atomic-powered propulsion plant.

Steel Bars . . .

Bar Prices, Page 147

Incoming orders for hot-rolled bars dipped slightly during November, largely due to disappointing automobile requirements. December order volume is difficult to measure because there have been few advance orders, but expectations are that the month's volume will fall below that of November, if for no other reason than the normal holiday lull at the end of the month.

Shops producing heavier steel forgings in the East are reported to have relatively better backlogs than those turning out smaller items. The strength is accounted for by propeller shafts, press cylinders, and heavy power equipment.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 147

Demand for concrete reinforcing bars is slower. Price competition among distributor-fabricators is increasing. Deliveries are prompt, and bar mills' backlogs are off noticeably.

In the East, slower demand for bridges and foundation work leaves less volume to be estimated. Schools and educational buildings lead current inquiry. The Social Security Building in Baltimore will take 6000 tons of bars to be furnished by Sweet's Steel Co., Williamsport, Pa.

Ferroalloys . . .

Ferroalloy Prices, Page 154

Ferroalloy production increased 9.31 per cent last year, reaching a new high of 2,639,681 net tons, reports the U. S. Bureau of Mines. In the preceding year it was 2,414,789 tons.

Shipments in 1956 amounted to 2,859,573 tons, against 2,541,489 in 1955. Shipments were up 1.89 per cent from 1955, but their value increased 20.8 per cent, due to higher prices.

Consumption of ferroalloying elements by the steel industry in 1956, as reported by the American Iron & Steel Institute was: Chromium, 166,118 tons; nickel, 58,929; aluminum, 26,958; molybdenum, 13,764; copper, 4379; titanium, 2820; tungsten, 1973; vanadium, 1433; lead, 1419; zirconium, 994; cobalt, 726; columbium-tantalum, 199; boron, 21.

Ferromanganese imports (excluding silicomanganese) last year amounted to 123,953 net tons valued at $28,511,690. In the preceding year, the total was 52,236 tons valued at $11,898,383.

FERROALLOY PRODUCTION & SHIPMENTS

(Net Tons)

	1956		1955	
	Production	Shipments	Production	Shipments
Ferromanganese[1]	1,062,171	1,052,432	974,902	1,013,619
Ferrosilicon	460,193	434,213	382,699	424,744
Silvery iron	438,694	413,953	459,291	488,292
Ferrochromium[2]	498,855	480,169	407,703	421,867
Ferrotitanium	7,762	7,228	6,565	6,881
Ferrophosphorus	73,175	94,545	77,115	75,862
Other[3]	98,831	107,033	106,514	110,224
Totals	2,639,681	2,859,573	2,414,789	2,541,489

[1]Including manganese briquets and silicomanganese.
[2]Including ferrochrome silicon, Chrom-X, chrom sil-X, and other chromium alloys.
[3]Including alsifer, ferroboron, ferrocolumbium, ferrotantalum-columbium, ferronickel, ferrotungsten, ferromolybdenum, simanal, spiegeleisen, zirconium-ferrosilicon, ferrovanadium, and miscellaneous.

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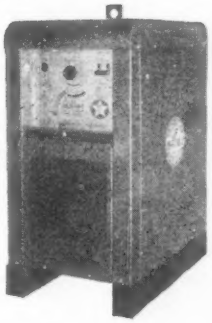

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In August, 1956, Miller began production on a new completely sealed semi-metallic rectifier. The date proved to be significant in welding circles. For 479 days later NOT A SINGLE FAILURE HAD BEEN REPORTED FROM THE FIELD!

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The 479 day test was made on thousands of Miller GOLD STAR welders working under every conceivable condition—indoors—outdoors—in hundreds of industries.

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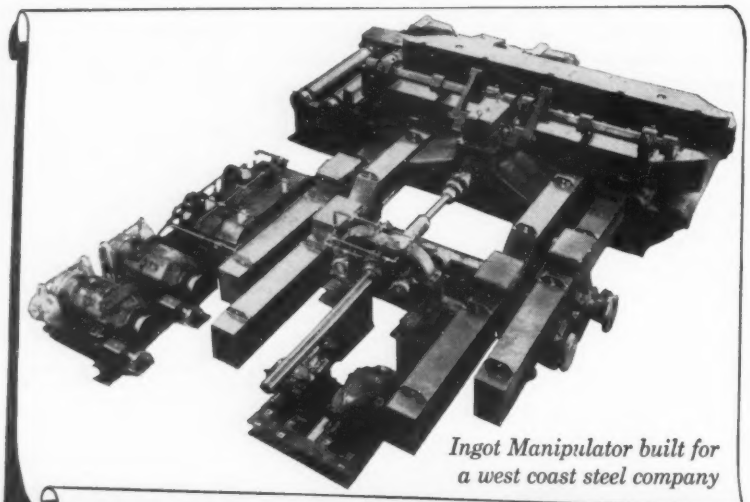

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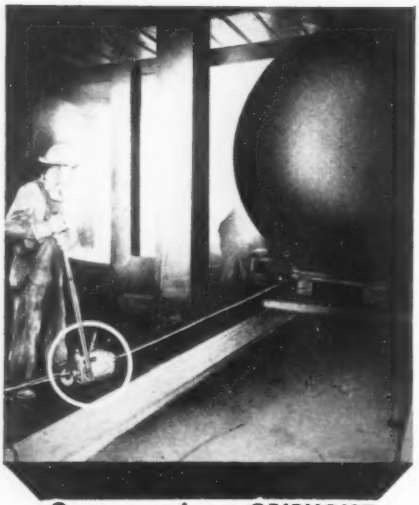
GRIPHOIST TIRFOR Saves Man-hours for You in Plant Installation and Maintenance



One man using a GRIPHOIST places heavy tank in 5 minutes

One man using GRIPHOIST TIRFOR often Does the job of a crew of 4 to 6 men

- Factory — one man using GRIPHOIST placed 3 sections of 40,000 lb. machine in minutes
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- Rigger — 2 men moved 40-ton load from truck to foundation — in lieu of costly set-up
- Construction — 6 GRIPHOISTS saved 1000 man-hours removing false-work on 12-span overpass
- Vans — Trucks — GRIPHOIST loads and unloads girders, angles and plates

Manually operated, GRIPHOIST weighs 42 lbs; rated for 3300 lbs. single line to 6 tons 4-part line; unlimited travel ½" cable.

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Sheets, Strip . . .

Sheet & Strip Prices, Pages 148 & 149

Sheet sellers are out beating the bushes for orders. Failure of automotive buying to develop in expected volume has put the mills in an uncomfortable backlog position, since buyers generally, following the automotive pattern, have been trimming inventories, and ordering only requirements in sight.

This absence of heavy forward buying is resulting in stepped up competition among the mills for orders. Reports are more frequently heard of freight absorption as sellers seek business in areas distant from their producing mills.

There is a little more optimism for first quarter. Meanhile, December volume is expected to fall under that of November, largely because of the holidays at year-end.

Auto inventories are still estimated around 18 days, but they are reporting starting to edge up slightly as makers aim for high December car output.

Tubular Goods . . .

Tubular Goods Prices, Page 151

Specialty tubing sales are slowing down, chiefly because of sluggish automotive demand and generally slow warehouse ordering.

Oil country tubular goods sales are falling as inventory reduction gains momentum among well drillers. Unfilled order backlogs at tube mills are off substantially. Rapid deliveries will be required in first quarter next year.

Foreign sales of pipe and tubing are down. A moderate inventory reduction program among foreign users is beginning. A Pittsburgh tubular goods producer thinks sales will be up sharply in second quarter next year, both on foreign and domestic account.

Wire . . .

Wire Prices, Pages 149 & 150

Pressure for prompt shipments is accompanying wire orders for December. Volume is light. Fourth quarter bookings for all grades of carbon wire (manufacturers, heading, and spring) will fall below earlier estimates, running not over

10 to 12 per cent, compared with third quarter.

Consumers are reducing inventories for yearend, but some are placing orders for January in slightly better volume. The wire mills are able to meet most delivery demands with skeleton crews, but any material increase in demands would soon be reflected in more extended shipments. Rod buying is slow.

Warehouse . . .

Warehouse Prices, Page 152

Demand for steel products from warehouses in the East is slow. In most instances, November volume was off slightly from October's and a further decline is expected this month. However, one important distributor of sheets and strip in the Pittsburgh area reports a 10 per cent increase in sales during November, compared with the previous month. The sales gain there was due to slightly improved automotive business and general completion of inventory reductions among customers.

Price weakness has developed in flat-rolled products and buttweld pipe in several districts.

Pig Iron . . .

Pig Iron Prices, Page 152

Prospects for an immediate improvement in demand for merchant iron are not bright. Foundries are receiving a relatively light flow of orders and are buying iron hand to mouth to cover needs. Automotive foundries are a little more active, and farm implement shops in the Chicago area are doing fairly well.

A big distributor of pig iron in the Cleveland district estimates that business for 1957 will be 8 to 10 per cent below that booked in 1956. "However," says a sales manager, "the business we are doing this year was considered mighty good five years ago, both in dollars and in tonnage."

Structural Shapes . . .

Structural Shape Prices, Page 147

Except for schools, less structural steel tonnage is being estimated in the East. (And many schools are designed to use more

Magnetic-Core Coil Classifier Inspects Tin Plate Continuously, Automatically

Beckman coil classifiers are measuring and recording characteristics and defects of tin plate around-the-clock, in continuous on-line operation. Linear travel, pinhole footage, over- and under-gage tolerances, coatings, quenching strain, slivers, abrasions, damaged edges are all detected and recorded while coils are rolling and shears flying.

Data from detectors is supplemented by manual entries showing date, purchase order, coil, line, and turn numbers. All information is then delayed for correct relationship to shear position. Upon shear activation, the appropriate totalized data is recorded on preprinted formats, with separate records for quality control and customer information. This in-process correlation of upstream detection with shear control and data printout permits accurate profiling of product with no lag in production – increases profit margins.

No vacuum tubes are used – all electronic circuitry consists of extremely reliable, toroidal magnetic cores and other passive elements. Without modification, Beckman coil classifiers are compatible with data reduction systems and in-process control.

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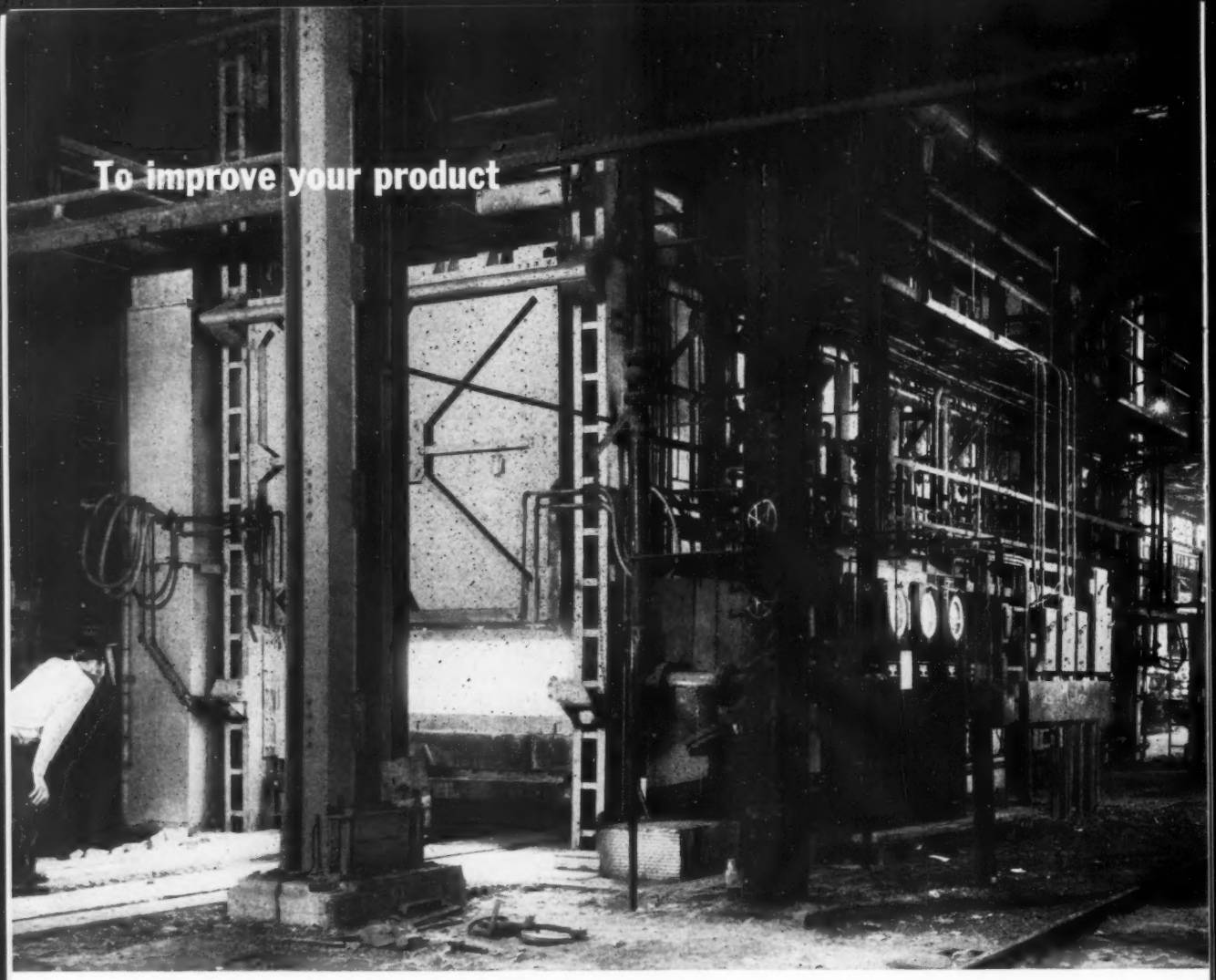

EXACT TEMPERATURE FOR ALCO FORGINGS

New furnaces for ALCO open-die and circular forgings use automatic heat-zone control for better quality of end product

New furnaces are part of ALCO's drive for top quality in open-die and circular forgings. The furnaces, like the car-bottom furnace above, are zoned, and each zone is automatically controlled to the proper heat level. This means that each ingot or billet reaches the forging press at the right temperature for planned reduction, and it also means that ALCO heat treatment is exact and thorough, assuring the best physical properties for the intended application.

Quality and leadership like this are in every step of production of an ALCO forging. They save you money. If you do extensive machining on open-die or circular forgings, Hi-Qua-Led Steel®, which only ALCO offers, can cut your costs up to 50 per cent.

ALCO forgings are available to 40 ft and 30,000 lb in the open-die type, and from 15 to 145 in. OD for circular forgings. For specific information contact the nearest ALCO sales office, or for new full-color brochure write Spring & Forge Division, Dept. OCF-6, P. O. Box 1065, Schenectady 1, New York.

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bars and bar shapes than structurals.)

Most fabricating shops are shipping tonnage in excess of bookings. In trying to maintain backlogs, they are estimating the bulk of the volume brought out that will fit into shop facilities.

The price for steel in place and deliveries are dominant factors in the placement of contracts.

Pittsburgh area fabricators report demand from the construction industry continues to decline, and only spotty demand is seen over the winter months.

Structural Shortage Over

Structural steel is now readily available for the entire construction industry, John G. Hotchkiss, district engineer, American Institute of Steel Construction, told a meeting of the Structural Steel & Ornamental Association of New Jersey.

Output of heavy structurals this year will be 25 per cent above 1956 levels to a record 6,700,000 tons, he said.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

800 tons, high school, Butler, Pa., to Pittsburgh-Des Moines Steel Co., Pittsburgh; William F. Sutter, Nescopeck, Pa., general contractor.

455 tons, girder bridge, near Aldridge, Ill., to Vincennes Steel Corp., Vincennes, Ind.

380 tons, WF beam bridges, Effingham County, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

350 tons, four-span deck bridge on U. S. Route 24, Ripley, Ill., to Illinois Steel Bridge Co., Jacksonville, Ill.

300 tons, dormitory and dining hall, Pennsylvania State University, University Park, Pa.; to Bethlehem Steel Co., Bethlehem, Pa.; John McShain Inc., Philadelphia, general contractor.

270 tons, high school, Portage, Pa., to Griffith-Custer Steel Co., Johnstown, Pa.; Gamble & Gamble Construction Co., Bolivar, Pa., general contractor.

100 tons, high school, Fairfax, Va., to the Southern Iron Works, Norfolk, Va.; Banks & Lee Inc., Washington, general contractor; reinforcing bars to Ceco Steel Products Inc.

STRUCTURAL STEEL PENDING

5000 tons, superstructure, contract No. 3, suspension bridge, Ogdensburg project, St. Lawrence County, New York-Granville, Canada; American Bridge Div., U. S. Steel Corp., Pittsburgh, is low bidder at $5,742,755. Bethlehem Steel Co. bid $5,960,830. Bids were taken Nov. 21 at Albany.

5000 tons, 2150-ft suspension bridge, Ogdensburg project, St. Lawrence River, N. Y.; postponed for second time; Albany, N. Y.

4760 tons, reservoir project, intake substructures and tunnels, power project, near Pierre, S. Dak.; bids Dec. 18, tentative, to Corps of Engineers, Omaha, Nebr.

3500 tons, addition to Exchange Bldg., Seattle; plans completed; bids soon.

1200 tons, New York state educational building, Albany, N. Y.; bids Nov. 26.

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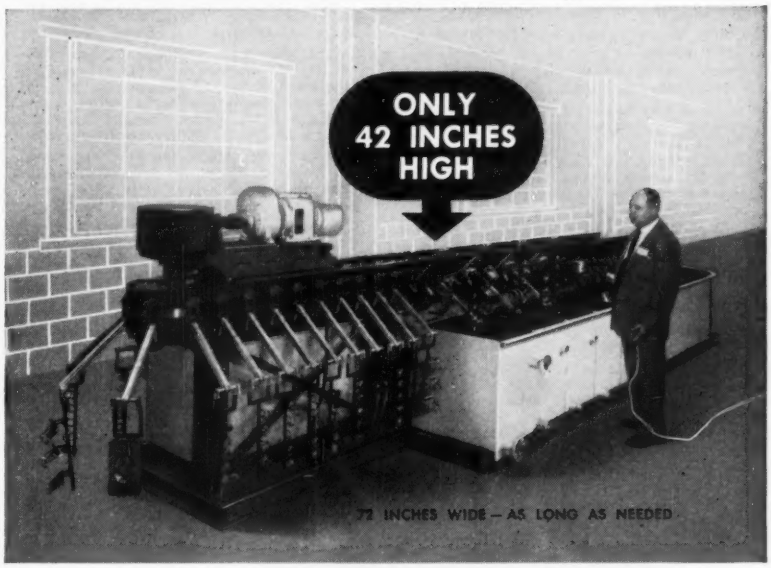
NEW SPACE SAVING, LOW COST UNIT WITH AUTOMATIC LOAD AND UNLOAD



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UP TO 40,000 PIECES PER DAY
540 RACKS OR ARMS PER HOUR

Yes, this new immersion processing machine by Stevens can process up to 40,000 pieces per day — and it has a variety of other uses too.

Ruggedly built, "Little Steve" can be obtained at a surprisingly low initial cost. It is ideal for large or small companies for it will fit many production cycles. It uses an arm as a rack or will take racks for small parts.

Being of small size it offers no floor space or load problems; involves low solution expense and means a small capital investment. It can be used easily as a laboratory testing machine.

For further information about "Little Steve" write for illustrated folder or call your local Stevens sales engineer.

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DETROIT 16, MICHIGAN

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WAREHOUSES AND OFFICES IN PRINCIPAL CITIES

960 tons, I-beam bridge, Jenkintown, Montgomery County, Pa.; bids Dec. 13, Harrisburg, Pa.

570 tons, I-beam bridge, Connellsville, Pa.; bids Dec. 13, Harrisburg, Pa., also 45 tons of reinforcing bars.

430 tons, five-span composite girder bridge, Farmington River, Farmington, Conn.; Oneglia & Gervasini, Torrington, Conn., low on general contract; also 165 tons of deformed steel bars, and 85 tons of steel piles.

275 tons, Public School No. 279, Brooklyn, N. Y.; pending.

270 tons, Public School No. 284, Brooklyn, N. Y.; bids closed.

230 tons, Mercer Island High School, Seattle; Dahlgren Construction Co., Seattle, general contractor.

Unstated, Geiger Air Field, aircraft shelter, Spokane; general contract to H. Halvorson Inc., Spokane, low at $219,319; steel to be furnished by government.

REINFORCING BARS . . .

REINFORCING BARS PLACED

6000 tons, Social Security Building, Baltimore, to Sweet's Steel Co., Williamsport, Pa.; McCloskey & Co., Philadelphia, general contractor.

1000 tons, dormitory and dining hall, Pennsylvania State University, University Park, Pa., to Bethlehem Steel Co., Bethlehem, Pa.; John McShain Inc., Philadelphia, general contractor.

960 tons, state highway structures, Onondaga-Wayne counties, New York, to the Bethlehem Steel Co., Bethlehem, Pa.; Bero Construction Corp., Waterloo, N. Y., general contractor; 1900 tons, structurals, to the Phoenix Bridge Co., Phoenixville, Pa.

895 tons, office building, State Department of Health, Atlanta, to Atlantic Steel Co., Atlanta; George A. Fuller Co., Atlanta, general contractor.

560 tons, dormitories, University of Miami, Coral Gables, Fla., to Joseph H. Fox Co., Birmingham; M. R. Harrison Construction Corp., Miami, Fla., general contractor.

255 tons, school, Philadelphia, to the Concrete Steel Co., Philadelphia.

250 tons, high school, Butler, Pa., to Copperweld Steel Co., Warren, Ohio; William F. Sutter, Nescopeck, Pa., general contractor.

140 tons, dormitory, Hamilton College, Clinton, N. Y. (70 tons of bars) to the Buffalo Steel Corp., Tonawanda, N. Y., and (70 tons, structurals) to the Utica Steam Engine & Boiler Works, Utica, N. Y.; R. S. Noonan Inc., York, Pa., general contractor.

190 tons, five state highway structures, Bow-Concord, N. H., to Scherer Steel Co., East Hartford, Conn.; Lane Construction Corp., Meriden, Conn., general contractor.

170 tons, addition, Roger Williams Hospital, Providence, R. I., Plantations Steel Co., Providence; Dimeo Construction Co., Providence, general contractor; 50 tons of structural steel to Tower Iron Works, Providence.

100 tons, high school, Somerville, N. J., to U. S. Steel Supply Div., U. S. Steel Corp., New York; Dean Construction Co., New York, general contractor.

67 tons, Washington state highway bridges, Yakima County, to Bethlehem Pacific Coast Steel Corp., Seattle; Lockyear & White, Longview, Wash., general contractor.

REINFORCING BARS PENDING

8965 tons, tunnels and intake substructures, power project, near Pierre, S. Dak.; bids Dec. 18, Corps of Engineers, Omaha, Nebr.; also 100 tons of wire mesh.

3000 tons, steel sheet piling; bids Nov. 26, U. S. Engineer, Louisville.

1025 tons, steel sheet piling; bids in to U. S. Engineer, Detroit.

1000 tons, retaining walls and underpass, Southwest Freeway, Second to Fourth Streets, Washington; bids Dec. 2, District of Columbia Highway Department.

455 tons overpass and grade separation, Seattle; S. S. Mullen Inc., Seattle, low at $755,636.

305 tons, state highway structures, including I-beam bridge, Jenkintown, Montgomery County, Pa.; bids Dec. 13, Harrisburg, Pa.; also 5118 linear feet of steel beam piles.

235 tons, deformed bars, two contracts; bids Nov. 27, General Stores Supply Office, Navy, Philadelphia.

180 tons, three flat slab bridges, Whatcom County, Wash.; bids to Olympia, Wash., Nov. 19.

157 tons, Washington state highway bridges, Kittitas and Spokane counties; bids to Olympia, Wash., Nov. 19.

156 tons, three Washington state spans, Grant County; bids to Olympia, Wash., Nov. 19.

114 tons, Washington state underpass, Pierce County; bids to Olympia, Wash., Dec. 3.

100 tons plus, three-level parking garage, for State of Washington, Olympia; bids to general administration director, Olympia, Wash., Dec. 17.

100 tons, Washington state, Yakima County, four slab bridges; bids to Olympia, Wash., Dec. 3.

100 tons, two Washington state highway bridges, Yakima County; general contract to Lockyear & White, Longview, Wash., low at $86,990.

100 tons, Oregon highway overpass, Marion County; Tom Lillebo, Reedsport, Oreg., low at $93,442.

90 tons, Washington state underpass, King County; bids to Olympia, Wash., Dec. 3.

PIPE . . .

STEEL PIPE PLACED

Unstated, system improvement, Ketchikan, Alaska; general contract to Macri Construction Co., Anchorage, Alaska, low at $216,034 to the Alaska Public Works.

PLATES . . .

PLATES PENDING

500 tons or more, penstocks, tunnel lines, and surge tanks, expansion of Ft. Peck, Mont., powerhouse and facilities; bids to U. S. Engineer, Garrison District, Riverdale, N. Dak., Jan. 7.

500 tons, water storage tank, West Linn, Oreg.; tank project postponed; new bids may be called.

150 tons, three tanks, storage capacity 280,000 gal.; Atomic Energy Commission, Las Vegas, Nev.

100 tons plus, storage tank, King County District No. 75, Seattle; Pittsburgh-Des Moines Steel Co., Seattle, low at $56,606.

Unstated, reactor building shell, 80 ft in diameter by 139 ft high, carbon steel plate, 1 in. thick; also water tank, 200,000-gal. capacity; bids to Atomic Energy Commission, Idaho Falls, Idaho, soon; project AT (10-1) 927.

Unstated tonnage, 100,000-gal water storage tank, naval auxiliary air station, Mayport, Fla.; bids Dec. 19, district public works office, Navy, Charleston, S. C.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Nickel Plate, 40 diesel units, including twenty 1750-hp road switchers to the Electro-Motive Div., General Motors Corp., La Grange, Ill.; ten 1800-hp road switchers to Alco Products Inc., New York; ten 1200-hp yard switchers to Fairbanks, Morse & Co., Chicago.

RAILROAD CARS PLACED

Canadian Pacific, 300 gondolas and 200 stock cars, to Canadian Car & Foundry Co., Montreal, Que.

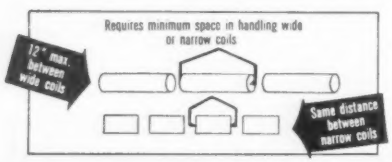
Handling Coil Stock?

CHECK THESE

C-F LIFTER ADVANTAGES

- 1 Lifter handles wide range of coil sizes
- Requires minimum of only 10" to 12" between piles —saves storage room
- 1 man operation — eliminates hookers
- Positive grip on coil — no damage to material

• C-F Coil Lifters are saving time and labor in many plants and warehouses because they can pick up, carry and set down a coil of steel faster and safer than any other method. Infinite jaw openings permit handling a very wide range of coil widths . . . carrying legs open fast, stay open until operator closes them on coil. Narrow legs require minimum space between piles – a space saving advantage. Made in motorized models for crane cab or pendant operation as well as manual types with chain wheel, in capacities from 3 tons up. Powered Rotating Heads available. Opening ranges to suit your requirements. Write for illustrated Bulletin.



CULLEN-FRIESTEDT CO.

1308 South Kilbourn Avenue • Chicago 23, Illinois

Price Indexes and Composites

Nov. 26, 1957	Week Ago	Month Ago	Nov. Avg.	Year Ago
181.7	181.7	181.7	181.7	168.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 26

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.600	Bars, Reinforcing	6.210
Rails, Light, 40 lb	7.067	Bars, C.F., Carbon	10.360
Tie Plates	6.600	Bars, C.F., Alloy	13.875
Axles, Railway	9.825	Bars, C.F., Stainless, 302 (lb)	0.553
Wheels, Freight Car, 33 in. (per wheel)	60.000	Sheets, H.R., Carbon	6.192
Plates, Carbon	6.150	Sheets, C.R., Carbon	7.089
Structural Shapes	5.942	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.535	Sheets, C.R., Stainless, 302 (lb)	0.688
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.650	Sheets, Electrical	12.025
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.355	Strip, C.R., Carbon	9.243
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.850	Strip, C.R., Stainless, 430 (lb)	0.493
Bars, H.R., Alloy	10.525	Strip, H.R., Carbon	6.245
Bars, H.R., Stainless, 303 (lb)	0.525	Pipe, Black, Buttweld (100 ft)	19.814
Bars, H.R., Carbon	6.425	Pipe, Galv., Buttweld (100 ft)	23.264
		Pipe, Line (100 ft)	199.023
		Casing, Oil Well, Carbon (100 ft)	194.499
		Casing, Oil Well, Alloy (100 ft)	304.610
		Tubes, Boiler (100 ft)	49.130
		Tubing, Mechanical, Carbon (100 ft)	24.953
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483
		Black Plate, Canmaking Quality (95 lb base box)	7.583
		Wire, Drawn, Carbon	10.225
		Wire, Drawn, Stainless, 430 (lb)	0.653
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.828
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Nov. 27 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	239.15	239.15	239.15	225.92	181.31
Index in cents per lb	6.479	6.479	6.479	6.111	4.912

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$146.03	$146.03	$146.03	$137.66	$110.98
No. 2 Fdry Pig Iron, GT	66.49	66.49	66.49	62.63	55.04
Basic Pig Iron, GT	65.99	65.99	65.99	62.18	54.66
Malleable Pig Iron, GT	67.27	67.27	67.27	63.41	55.77
Steelmaking Scrap, GT	33.00	33.17	35.33	64.67	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Nov. 27 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.425	5.075	3.95
Bars, H.R., Chicago	5.425	5.425	5.425	5.075	3.95
Bars, H.R., deld., Philadelphia	5.725	5.725	5.725	5.35	4.502
Bars, C.F., Pittsburgh	7.30*	7.30*	7.30*	6.85*	4.925
Shapes, Std., Pittsburgh	5.275	5.275	5.275	5.00	3.85
Shapes, Std., Chicago	5.275	5.275	5.275	5.00	3.85
Shapes, deld., Philadelphia	5.545	5.545	5.545	5.40	4.13
Plates, Pittsburgh	5.10	5.10	5.10	4.85	3.90
Plates, Chicago	5.10	5.10	5.10	4.85	3.90
Plates, Coatesville, Pa.	5.10	5.10	5.10	5.25	4.35
Plates, Sparrows Point, Md.	5.10	5.10	5.10	4.85	3.90
Plates, Claymont, Del.	5.70	5.70	5.70	5.35	4.35
Sheets, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.775
Sheets, H.R., Chicago	4.925	4.925	4.925	4.675	3.775
Sheets, C.R., Pittsburgh	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Chicago	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Detroit	6.05-6.15	6.05-6.15	6.05-6.15	5.75-5.85	4.775
Sheets, Galv., Pittsburgh	6.60	6.60	6.60	6.30	5.075
Strip, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.75-4.225
Strip, H.R., Chicago	4.925	4.925	4.925	4.675	3.725
Strip, C.R., Pittsburgh	7.15	7.15	7.15	6.85	5.10-5.80
Strip, C.R., Chicago	7.15	7.15	7.15	6.85	5.35
Strip, C.R., Detroit	7.25	7.25	7.25	6.95	5.30-6.05
Wire, Basic, Pittsburgh	7.65	7.65	7.65	7.20	5.10-5.225
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.20	6.20-6.35
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.95	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$96.00	$96.00	$96.00	$91.50	$70.50
Wire rods, 7/32-5/8" Pitts.	6.15	6.15	6.15	5.80	4.425

PIG IRON, Gross Ton

	Nov. 27 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$63.50	$55.50
Basic, Valley	66.00	66.00	66.00	62.50	54.50
Basic, deld., Phila.	70.01	70.01	70.01	66.26	59.25
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, deld., Phila.	70.51	70.51	70.51	66.76	59.75
No. 2 Fdry, Birm.	62.50	62.50	62.50	59.00	51.38
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	70.20	66.70	58.93
Malleable, Valley	66.50	66.50	66.50	63.00	55.00
Malleable, Chicago	66.50	66.50	66.50	63.00	55.00
Ferromanganese, Duquesne	245.00†	245.00†	245.00†	235.00†	228.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$33.50	$33.50	$35.50	$66.50	$44.00
No. 1 Heavy Melt, E. Pa.	33.50	33.50	36.50	62.50	41.50
No. 1 Heavy Melt, Chicago	32.00	32.50	34.00	65.00	42.50
No. 1 Heavy Melt, Valley	31.50	31.50	33.50	66.50	44.00
No. 1 Heavy Melt, Cleve.	28.50	28.50	30.50	65.00	43.00
No. 1 Heavy Melt, Buffalo	32.50	32.50	36.50	59.50	43.00
Rails, Rerolling, Chicago	48.00	48.50	49.50	89.00	52.50
No. 1 Cast, Chicago	35.50	35.50	35.50	50.50	50.00

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$14.50	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	17.50	17.00

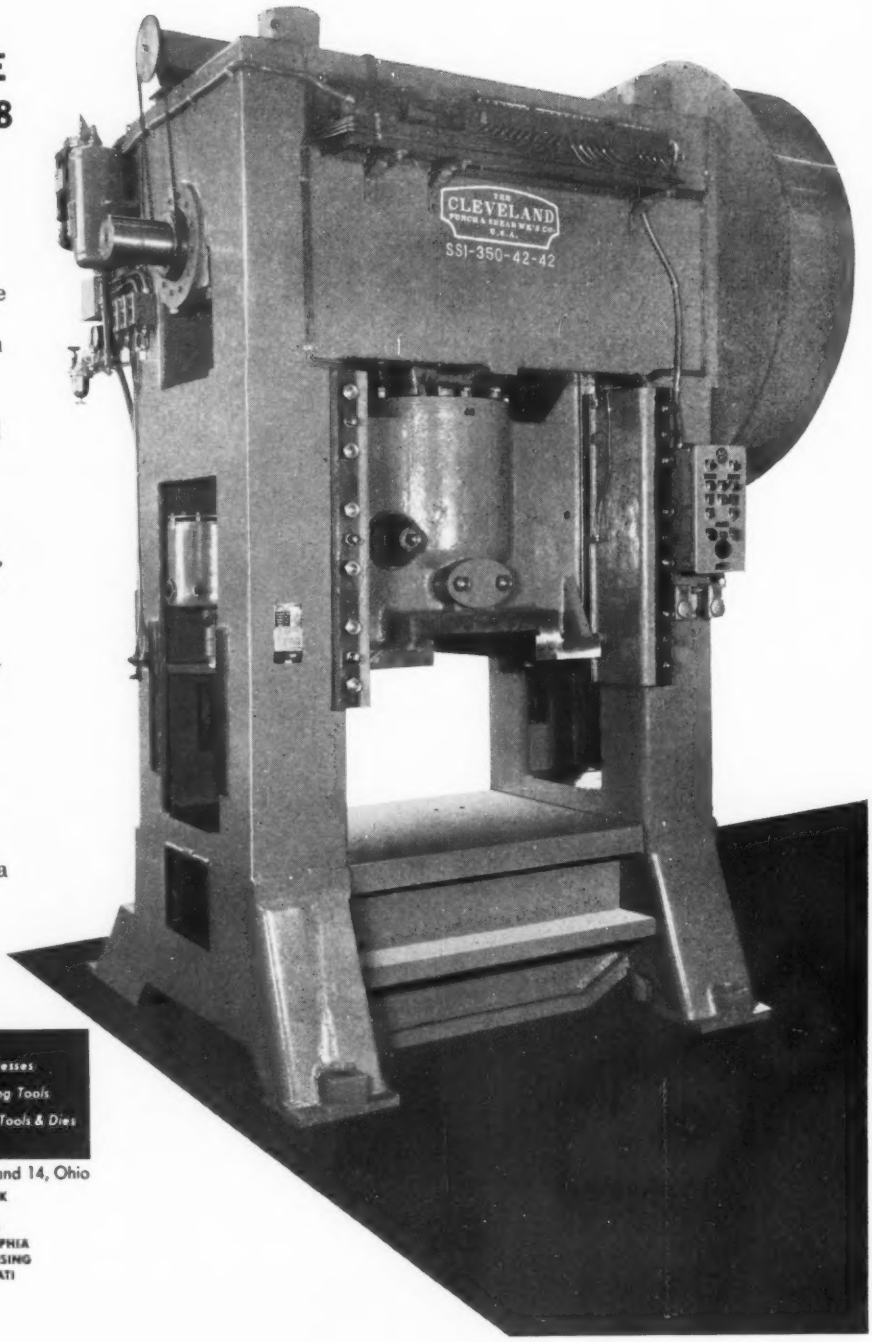
4 OF THESE ECONOMICAL CLEVELAND PRESSES

**newly installed—
now on FULL TIME
production of 1958
automobile parts!**

One of the leading automobile manufacturers recently added *four* of these Cleveland Single Crank Presses to boost production of parts for their 1958 line of cars.

Designed for uninterrupted production with every important cost-reducing and safety feature, these new 350-ton-capacity presses have a stroke of 3″, a shut height of 22″, a bed area of 42 x 42″, and operate at 60 rpm.

If production and economy are your problem, let us send you complete details on the improved performance of Cleveland Presses. You have eleven different types of presses to choose from, each of which can be furnished in a wide range of sizes and capacities to suit your particular requirements.



THE CLEVELAND PUNCH & SHEAR WORKS CO.
Established 1880

Power Presses
Fabricating Tools
Punching Tools & Dies

E. 40th and St. Clair Avenue, Cleveland 14, Ohio

Offices NEW YORK, DETROIT, CHICAGO, PHILADELPHIA, EAST LANSING, CINCINNATI

AA-6635

Steel Prices

Mill prices as reported to STEEL, Nov. 27, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 148; to footnotes, page 150.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$73.50

INGOTS, Alloy (NT)
Detroit S41 .....$77.00
Farrell, Pa. S3 .....77.00
Lowellville,O. S3 .....77.00
Midland,Pa. C18 .....77.00
Munhall,Pa. U5 .....77.00
Sharon,Pa. S3 .....77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 .....$77.50
Bridgeport,Conn. C32 ..80.50
Buffalo R2 .....77.50
Clairton,Pa. U5 .....77.50
Ensley,Ala. T2 .....77.50
Fairfield,Ala. T2 .....77.50
Fontana,Calif. K1 .....88.00
Gary,Ind. U5 .....77.50
Johnstown,Pa. B2 .....77.50
Lackawanna,N.Y. B2..77.50
Munhall,Pa. U5 .....77.50
S.Chicago,Ill. R2, U5..77.50
S.Duquesne,Pa. U5 ....77.50
Sterling,Ill. N15 .....77.50
Youngstown R2 .....77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$96.00
Bridgeport,Conn. C32..101.00
Buffalo R2 .....96.00
Canton,O. R2 .....98.50
Clairton,Pa. U5 .....96.00
Conshohocken,Pa. A3.101.00
Ensley,Ala. T2 .....96.00
Fairfield,Ala. T2 ....96.00
Fontana,Calif. K1 ...105.50
Gary,Ind. U5 .....96.00
Geneva,Utah C11 ....96.00
Houston S5 .....101.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2..96.00
LosAngeles B3 .....105.50
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
Seattle B3 .....109.50
Sharon,Pa. S3 .....96.00
S.Chicago R2, U5,W14..96.00
S.Duquesne,Pa. U5 ...96.00
S.SanFrancisco B3 ...105.50
Warren,O. C17 .....96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$114.00
Bridgeport,Conn. C32..114.00
Buffalo R2 .....114.00
Canton,O. R2, T7 ....114.00
Conshohocken,Pa. A3..121.00
Detroit S41 .....114.00
Economy,Pa. B14 ....114.00
Farrell,Pa. S3 .....114.00
Fontana,Calif. K1 ....135.00
Gary,Ind. U5 .....114.00
Houston S5 .....119.00
Ind.Harbor, Ind. Y1 ..114.00
Johnstown,Pa. B2 ....114.00
Lackawanna,N.Y. B2.114.00
Los Angeles B3 .....134.00
Lowellville,O. S3 ....114.00
Massillon,O. R2 ....114.00
Midland,Pa. C18 .....114.00
Munhall,Pa. U5 .....114.00
Sharon,Pa. S3 .....114.00
S.Chicago R2, U5,W14.114.00
S.Duquesne,Pa. U5 ....114.00
Struthers,O. Y1 .....114.00
Warren,O. C17 .....114.00

ROUNDS, SEAMLESS TUBE (NT)
Bridgeport,Conn. C32.$122.50
Buffalo R2 .....117.50
Canton,O. R2 .....120.00
Cleveland R2 .....117.50
Gary,Ind. U5 .....117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 ...117.50
Warren,O. C17 .....117.50

SKELP
Aliquippa,Pa. J5 .....5.075
Munhall,Pa. U5 .....4.875
Warren,O. R2 .....4.875
Youngstown R2, U5 ..4.875

WIRE RODS
AlabamaCity,Ala. R2 ..6.15
Aliquippa,Pa. J5 .....6.15
Alton,Ill. L1 .....6.35
Buffalo W12 .....6.15
Cleveland A7 .....6.15
Donora,Pa. A7 .....6.15
Fairfield,Ala. T2 .....6.15
Houston S5 .....6.40
IndianaHarbor,Ind. Y1..6.15
Johnstown,Pa. B2 .....6.15
Joliet,Ill. A7 .....6.15
KansasCity,Mo. S5 ....6.40
Kokomo,Ind. C16 .....6.25
LosAngeles B3 .....6.95
Minnequa,Colo. C10 ....6.40
Monessen,Pa. P17 .....6.15
N.Tonawanda,N.Y. B11..6.15
Pittsburg,Calif. C11 ....6.95
Portsmouth,O. P12 ....6.15
Roebling,N.J. R5 .....6.25
S.Chicago,Ill. R2 .....6.15
SparrowsPoint,Md. B2 ..6.25
Sterling,Ill. (1) N15 ....6.15
Sterling,Ill. N15 .....6.25
Struthers,O. Y1 .....6.15
Worcester,Mass. A7 ....6.45

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 .....5.275
Atlanta A11 .....5.475
Aliquippa,Pa. J5 .....5.275
Bessemer,Ala. T2 .....5.275
Bethlehem,Pa. B2 .....5.325
Birmingham C15 .....5.275
Clairton,Pa. U5 .....5.275
Fairfield,Ala. T2 .....5.275
Fontana,Calif. K1 ....6.075
Gary,Ind. U5 .....5.275
Geneva,Utah C11 .....5.275
Houston S5 .....5.375
Ind.Harbor,Ind. I-2 ...5.275
Johnstown,Pa. B2 .....5.325
Joliet,Ill. P22 .....5.275
KansasCity,Mo. S5 ....5.375
Lackawanna,N.Y. B2..5.325
LosAngeles B3 .....5.975
Minnequa,Colo. C10 ...5.575
Munhall,Pa. U5 .....5.275
Niles,Calif. P1 .....5.925
Phoenixville,Pa. P4 ...5.325
Portland,Oreg. O4 ....6.025
Seattle B3 .....6.025
S.Chicago,Ill. U5, W14..5.275
S.SanFrancisco B3 ....5.925
Sterling,Ill. N15 .....5.275
Torrance,Calif. C11 ..5.975
Weirton,W.Va. W6 ....5.275

Wide Flange
Bethlehem,Pa. B2 ....5.325
Clairton,Pa. U5 .....5.275
Fontana,Calif. K1 ....6.225
IndianaHarbor,Ind. I-2.5.275
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 .....5.275
Phoenixville,Pa. P4 ...5.325
S.Chicago,Ill. U5 .....5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.65
KansasCity, Mo. S5 ....6.65
Munhall,Pa. U5 .....6.55
S.Chicago,Ill. U5 .....6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....7.75
Bessemer,Ala. T2 .....7.75
Bethlehem,Pa. B2 .....7.80
Clairton,Pa. U5 .....7.75
Fairfield,Ala. T2 .....7.75
Fontana,Calif. K1 ....8.55
Gary,Ind. U5 .....7.75
Geneva,Utah C11 .....7.75
Houston S5 .....7.85
Ind.Harbor,Ind. I-2, Y1 7.75
Johnstown,Pa. B2 .....7.80
KansasCity,Mo. S5 ....7.85
Lackawanna,N.Y. B2 ..7.80
LosAngeles B3 .....8.45
Munhall,Pa. U5 .....7.75
Seattle B3 .....8.50
S.Chicago,Ill. U5, W14..7.75
S.SanFrancisco B3 ....8.40
Struthers,O. Y1 .....7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....7.80
Lackawanna,N.Y. B2 ..7.80
Munhall,Pa. U5 .....7.75
S.Chicago,Ill. U5 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.325
Lackawanna,N.Y. B2..5.325
Munhall,Pa. U5 .....5.275
S.Chicago,Ill. U5 .....5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 ..6.225
Munhall,Pa. U5 .....6.225
S.Chicago,Ill. U5 .....6.225
Weirton,W.Va. W6 ....6.225

PLATES

PLATES, Carbon Steel
Ala.City, Ala. R2 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky. (15) A10..5.10
Bessemer,Ala. T2 .....5.10
Clairton,Pa. U5 .....5.10
Claymont,Del. C22 .....5.10
Cleveland J5, R2 .....5.20
Coatesville,Pa. L7 .....5.10
Conshohocken,Pa. A3 ..5.20
Ecorse,Mich. G5 .....5.20
Fairfield,Ala. T2 .....5.10
Fontana,Calif.(30) K1 ..5.90
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.10
GraniteCity,Ill. G4 ....5.30
Harrisburg,Pa. P4 ....5.80
Houston S5 .....5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown, Pa. B2 .....5.10
Lackawanna,N.Y. B2 ..5.10
LoneStar,Tex. L6 .....5.45
Mansfield,O. E6 .....5.10
Minnequa,Colo. C10 ....5.95
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Pittsburgh J5 .....5.10
Riverdale,Ill. A1 .....5.10
Seattle B3 .....6.00
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 5.10
SparrowsPoint,Md. B2 ..5.10
Sterling,Ill. N15 .....5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Youngstown R2, U5, Y1.5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 .....6.75
Fontana,Calif. K1 .....7.55
Geneva,Utah C11 .....6.75
Houston S5 .....6.85
Johnstown,Pa. B2 .....6.75
SparrowsPoint,Md. B2 ..6.75

PLATES, Wrought Iron
Economy,Pa. B14 .....13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.625
Bessemer,Ala. T2 .....7.625
Clairton,Pa. U5 .....7.625
Claymont,Del. C22 .....7.625
Cleveland J5, R2 .....7.625
Coatesville,Pa. L7 .....7.925
Conshohocken,Pa. A3 ..7.625
Economy,Pa. B14 .....7.625
Ecorse,Mich. G5 .....7.725
Fairfield,Ala. T2 .....7.625
Farrell,Pa. S3 .....7.625
Fontana,Calif.(30) K1 ..8.425
Gary,Ind. U5 .....7.625
Geneva,Utah C11 .....7.625
Houston S5 .....7.725
Ind.Harbor,Ind. I-2, Y1 7.625
Johnstown,Pa. B2 .....7.625
Munhall,Pa. U5 .....7.625
Pittsburgh J5 .....7.625
Seattle B3 .....8.525
Sharon,Pa. S3 .....7.625
S.Chicago,Ill. U5, W14 7.625
SparrowsPoint,Md. B2..7.625
Warren,O. R2 .....7.625
Youngstown U5 .....7.625

PLATES, ALLOY
Aliquippa,Pa. J5 .....7.20
Claymont,Del. C22 .....7.20
Coatesville,Pa. L7 .....7.20
Economy,Pa. B14 .....7.20
Farrell,Pa. S3 .....7.20
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 .....7.20
Houston S5 .....7.30
Ind.Harbor,Ind. Y1 ....7.20
Johnstown,Pa. B2 .....7.20
Lowellville,O. S3 .....7.20
Munhall,Pa. U5 .....7.20
Newport,Ky. A2 .....7.20
Pittsburgh J5 .....7.20
Seattle B3 .....8.10
Sharon,Pa. S3 .....7.20
S.Chicago,Ill. U5, W14..7.20
SparrowsPoint,Md. B2 ..7.20
Youngstown Y1 .....7.20

FLOOR PLATES
Cleveland J5 .....6.175
Conshohocken,Pa. A3 ..6.175
Ind.Harbor,Ind. I-2 ...6.175
Munhall,Pa. U5 .....6.175
S.Chicago,Ill. U5 .....6.175

PLATES, Ingot Iron
Ashland c.l. (15) A10..5.35
Ashland l.c.l. (15) A10..5.85
Cleveland c.l. R2 .....5.85
Warren,O. c.l. R2 .....5.85

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.425
Aliquippa,Pa.(9) J5 ...5.425
Alton,Ill. L1 .....5.625
Atlanta(9) A11 .....5.625
Bessemer,Ala.(9) T2 ..5.425
Birmingham(9) C15 ..5.425
Bridgeport,Conn.(9) C32.5.65
Buffalo(9) R2 .....5.425
Clairton,Pa. (9) U5 ....5.425
Cleveland(9) R2 .....5.425
Ecorse,Mich.(9) G5 ....5.525
Emeryville,Calif. J7 ..6.175
Fairfield,Ala(9) T2 ..5.425
Fairless,Pa. (9) U5 ..5.575
Fontana,Calif.(9) K1 ..6.125
Gary,Ind.(9) U5 .....5.425
Houston (9) S5 .....5.675
Ind.Harbor(9) I-2, Y1 5.425
Johnstown,Pa.(9) B2 ..5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
LosAngeles(9) B3 ....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ..5.875
Niles,Calif. P1 .....6.125
N.T'wanda,N.Y.(46)B11 5.775
Pittsburg,Calif.(9) C11.6.125
Pittsburgh(9) J5 .....5.425
Portland,Oreg. O4 .....6.175
Seattle B3, N14 .....6.175
S.Ch'c'go(9)R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5..5.425
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15..5.425
Sterling,Ill.(9) N15 ....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ..5.425
Torrance,Calif.(9) C11.6.125
Youngstown(9) R2, U5.5.425

BARS, H.R. Leaded Alloy
(Including leaded extra)
Warren,O. C17 .....7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.475
Bethlehem,Pa. B2 .....6.475
Bridgeport,Conn. C32 ..6.55
Buffalo R2 .....6.475
Canton,O. R2, T7 .....6.475
Clairton,Pa. U5 .....6.475
Detroit S41 .....6.475
Economy,Pa. B14 .....6.475
Ecorse,Mich. G5 .....6.575
Fairless,Pa. U5 .....6.625
Farrell,Pa. S3 .....6.475
Fontana,Calif. K1 .....7.525
Gary,Ind. U5 .....6.475
Houston S5 .....6.725
Ind.Harbor,Ind. I-2, Y1 6.475
Johnstown,Pa. B2 .....6.475
KansasCity,Mo. S5 .....6.725
Lackawanna,N.Y. B2 ..6.475
Lowellville,O. S3 .....6.475
LosAngeles B3 .....7.525
Massillon,O. R2 .....6.475
Midland,Pa. C18 .....6.475
Pittsburgh J5 .....6.475
Sharon,Pa. S3 .....6.475
S.Chicago R2, U5, W14 6.475
S.Duquesne,Pa. U5 .....6.475
Struthers,O. Y1 .....6.475
Warren,O. C17 .....6.475
Youngstown U5 .....6.475

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....7.925
Bessemer,Ala. T2 .....7.925
Bethlehem,Pa. B2 .....7.925
Bridgeport,Conn. C32 ..7.95
Clairton,Pa. U5 .....7.925
Cleveland R2 .....7.925
Ecorse,Mich. G5 .....8.025
Fairfield,Ala. T2 .....7.925
Fontana,Calif. K1 .....8.625
Gary,Ind. U5 .....7.925
Houston S5 .....8.175
Ind.Harbor,Ind. Y1 ....7.925
Johnstown,Pa. B2 .....7.925
KansasCity,Mo. S5 ....8.175
Lackawanna,N.Y. B2..7.925
LosAngeles B3 .....8.625
Pittsburgh J5 .....7.925
Seattle B3 .....8.675
S.Chicago,Ill. U5, W14 7.925
S.Duquesne,Pa. U5 .....7.925
S.San Francisco B3 ...8.675
Struthers,O. Y1 .....7.925
Youngstown U5 .....7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.575
Houston(9) S5 .....5.675
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
Sterling,Ill. N15 .....5.525
Sterling,Ill.(1) N15 ....5.425
Tonawanda,N.Y. B12 ..5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.425
Atlanta A11 .....5.625
Joliet,Ill. P22 .....5.425
Niles,Calif. P1 .....6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SanFrancisco S7 .....6.275
Seattle B3 .....6.175

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.80
KansasCity,Mo. S5 ....6.80
Pittsburgh J5 .....6.55
Youngstown U5 .....6.55

BARS, C.F., Leaded Alloy (including leaded extra)
Ambridge,Pa. W18 ...9.925
BeaverFalls,Pa. M12 ..9.925
Camden,N.J. P13 ....10.10
Chicago W18 .....9.925
Cleveland C20 .....9.925
Elyria,O. W8 .....9.925
LosAngeles P2, S30
(Grade A) 11.30
(Grade B) 11.80
Monaca,Pa. S17 .....9.925
Newark,N.J. W18 ....10.10
SpringCity,Pa. K3 ....10.10
Warren,O. C17 .....9.925

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....7.30
BeaverFalls,Pa. M12,R2 7.30
Birmingham C15 .....7.90
Bridgeport,Conn. C32 ..7.65
Buffalo B5 .....7.35
Camden,N.J. P13 .....7.75
Carnegie,Pa. C12 .....7.30
Chicago W18 .....7.30
Cleveland A7, C20 .....7.30
Detroit B5, P17 .....7.50
Detroit S41 .....7.30
Donora,Pa. A7 .....7.30
Elyria,O. W8 .....7.30
FranklinPark,Ill. N5 ...7.30
Gary,Ind. R2 .....7.30
GreenBay,Wis. F7 .....7.30
Hammond,Ind. J5, L2 ..7.30
Hartford,Conn. R2 .....7.80
Harvey,Ill. B5 .....7.30
LosAngeles (49), S30 ..8.75
LosAngeles P2, R2 ...8.75
Mansfield,Mass. B5 ...7.85
Massillon,O. R2, R8 ....7.30
Midland,Pa. C18 .....7.30
Monaca,Pa. S17 .....7.30
Newark,N.J. W18 .....7.75
NewCastle,Pa.(17) B4 ..7.30
Pittsburgh J5 .....7.30
Plymouth,Mich. P5 ....7.55
Putnam,Conn. W18 .....7.85
Readville,Mass. C14 ....7.85
S.Chicago,Ill. W14 .....7.30
SpringCity,Pa. K3 .....7.75
Struthers,O. Y1 .....7.30
Warren,O. C17 .....7.30
Willimantic,Conn. J5 ..7.80
Waukegan,Ill. A7 .....7.30
Youngstown F3, Y1 ....7.30

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....8.775
BeaverFalls,Pa.M12,R2 8.775
Bethlehem,Pa. B2 .....8.775
Bridgeport,Conn. C32 ..8.925
Buffalo B5 .....8.775
Camden,N.J. P13 .....8.95
Canton,O. T7 .....8.775
Carnegie,Pa. C12 .....8.775
Chicago W18 .....8.775
Cleveland A7, C20 .....8.775
Detroit B5, P17 .....8.975
Detroit S41 .....8.775
Donora,Pa. A7 .....8.775
Elyria,O. W8 .....8.775
FranklinPark,Ill. N5 ..8.775
Gary,Ind. R2 .....8.775
GreenBay,Wis. F7 .....8.775
Hammond,Ind. J5, L2..8.775
Hartford,Conn. R2 .....9.075
Harvey,Ill. B5 .....8.775
Lackawanna,N.Y. B2 ..8.775
LosAngeles P2 .....10.65
LosAngeles S30 .....10.75
Mansfield,Mass. B5 ...9.075
Massillon,O. R2, R8 ..8.775
Midland,Pa. C18 .....8.775
Monaca,Pa. S17 .....8.775
Newark,N.J. W18 .....8.95
Plymouth,Mich. P5 ....8.975
S.Chicago,Ill. W14 .....8.775
SpringCity,Pa. K3 .....8.95
Struthers,O. Y1 .....8.775
Warren,O. C17 .....8.775
Waukegan,Ill. A7 .....8.775
Worcester,Mass. A7 ....9.075
Youngstown F3, Y1 ....8.775

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ....5.425
Atlanta A11 .....5.625
Birmingham C15, S42 .5.425
Bridgeport,Conn. C32 ...5.65
Buffalo R2 .....5.425
Cleveland R2 .....5.425
Ecorse,Mich. G5 .....5.775
Emeryville,Calif. J7 ..6.175
Fairfield,Ala. T2 ....5.425
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 ....6.125
Ft.Worth,Tex.(4)(26)T45.875
Gary,Ind. U5 .....5.425
Houston S5 .....5.675
Ind.Harbor,Ind. I-2,Y1 5.425
Johnstown,Pa. B2 ....5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo. S5 ...5.675
Lackawanna,N.Y. B2..5.425
LosAngeles B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ..5.875
Niles,Calif. P1 .....6.125
Pittsburg,Calif. C11 ..6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.175
S.Chicago,Ill. R2 ....5.425
S.Duquesne,Pa. U5 ....5.425
S.SanFrancisco B3 ....6.175
SparrowsPoint,Md. B2.5.425
Sterling,Ill.(1) N15 ..5.425
Sterling,Ill. N15 .....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ..6.00
Torrance,Calif. C11....6.125
Youngstown R2, U5 ..5.425

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.65
Chicago U8 .....6.91
Cleveland U8 .....6.89
Johnstown,Pa. B2 ....7.08
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..6.85
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.55
Philadelphia U8 .....7.38
Pittsburgh J5, U8 ....7.10
Seattle B3, N14 .....7.70
SparrowsPt.,Md. B2 ....7.08
St.Paul U8 .....7.92
Williamsport,Pa. S19 ...7.00

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy,(Staybolt)B14 18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2.5.325
ChicagoHts.(4)(44) I-2,.5.425
ChicagoHts.(4) C2 ....5.425
Ft.Worth,Tex.(26) T4..5.875
Franklin,Pa. (3) F5 ..5.325
Franklin,Pa. (4) F5 ..5.425
JerseyShore,Pa.(3) J8 ..5.30
Marion,O.(3) P11 ....5.325
Tonawanda(3) R12 ....5.325
Tonawanda(4) B12 ....6.00
Williamsport,Pa. (3)S19 5.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ....4.925
Allenport,Pa. P7 .....4.925
Ashland,Ky.(8) A10 ..4.925
Cleveland J5, R2 ....4.925
Conshohocken,Pa. A3 ..4.975
Detroit(8) M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 ....4.925
Fairless,Pa. U5 .....4.975
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....4.925
Geneva,Utah C11 ....5.025
GraniteCity,Ill.(8) G4..5.125
Ind.Harbor,Ind. I-2, Y1 4.925
Irvin,Pa. U5 .....4.925
Lackawanna,N.Y. B2 .4.925
Mansfield,O. E6 .....4.925
Munhall,Pa. U5 .....4.925
Newport,Ky.(8) A2 ..4.925
Niles,O. M21, S3 .....4.925
Pittsburg,Calif. C11 ..5.625
Pittsburgh J5 .....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill. A1 ....4.925
Sharon,Pa. S3 .....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2 .4.925
Steubenville,O. W10 ..4.925
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5, Y1 ..4.925

SHEETS, H.R., (19 Ga. & Lighter)

Niles,O. M21 .....6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky. A2 .....8.10
Youngstown U5, Y1 ...8.10

SHEETS, H.R.(14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 ....7.275
Conshohocken,Pa. A3..7.325
Ecorse,Mich. G5 .....7.375
Fairfield,Ala. T2 .....7.275
Fairless,Pa. U5 .....7.325
Farrell,Pa. S3 .....7.275
Fontana,Calif. K1 ....8.175
Gary,Ind. U5 .....7.275
Ind.Harbor,Ind. I-2, Y1 7.275
Irvin,Pa. U5 .....7.275
Lackawanna (35) B2 ..7.275
Munhall,Pa. U5 .....7.275
Pittsburgh J5 .....7.275
S.Chicago,Ill. U5, W14 7.275
Sharon,Pa. S3 .....7.275
SparrowsPoint(36) B2 .7.275
Warren,O. R2 .....7.275
Weirton,W.Va. W6 ...7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.675
Warren,O. R2 .....5.675

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 .....6.80

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.05
Allenport,Pa. P7 .....6.05
Cleveland J5, R2 .....6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 .....6.05
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....6.05
Fairless,Pa. U5 .....6.10
Follansbee,W.Va. F4 ..6.05
Fontana,Calif. K1 ....7.30
Gary,Ind. U5 .....6.05
GraniteCity,Ill. G4 ....6.25
Ind.Harbor,Ind. I-2, Y1 6.05
Irvin,Pa. U5 .....6.05
Lackawanna,N.Y. B2 ..6.05
Mansfield,O. E6 .....6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 .....6.05
Pittsburg,Calif. C11 ...7.00
Pittsburgh J5 .....6.05
Portsmouth,O. P12 ....6.05
SparrowsPoint,Md. B2 ..6.05
Steubenville,O. W10 ...6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Yorkville,O. W10 .....6.05
Youngstown Y1 .....6.05

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.975
Ecorse,Mich. G5 .....9.075
Fairless,Pa. U5 .....9.025
Fontana,Calif. K1....10.275
Gary,Ind. U5 .....8.975
IndianaHarbor,Ind. Y1 8.975
Irvin,Pa. U5 .....8.975
Lackawanna (37) B2 ..8.975
Pittsburgh J5 .....8.975
SparrowsPoint (38) B2 8.975
Warren,O. R2 .....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1 .....8.975

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	.6.95	7.20
Canton,O. R2	....6.95	7.45
Fairfield T2	....6.95	7.20
Gary,Ind. U5	....6.95	7.20
GraniteCity,Ill. G4	7.15	...
Ind.Harbor I-2	..6.95	7.20
Irvin,Pa. U5	....6.95	7.20
Kokomo,Ind. C16	7.05	...
MartinsFry. W10	.6.95	7.20
Pitts.,Calif. C11	..7.70	...
Pittsburgh J5	....6.95	...
SparrowsPt. B2	..6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 .. 7.20

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 ....6.60‡
Ashland,Ky. A10 ....6.60†
Canton,O. R2 .....6.60‡
Dover,O. R1 .....6.60†
Fairfield,Ala. T2 ....6.60†
Gary,Ind. U5 .....6.69•
GraniteCity,Ill. G4 ....6.80•
Ind.Harbor,Ind. I-2 ...6.60†
Irvin,Pa. U5 .....6.60•
Kokomo,Ind. C16 ....6.70‡
MartinsFerry,O. W10 ..6.60•
Middletown,O. A10 ..6.60†
Pittsburg,Calif. C11 ...7.35•
Pittsburgh J5 .....6.60†
SparrowsPt.,Md. B2 ..6.60†
Warren,O. R2 .....6.60†
Weirton,W.Va. W6 ....6.60•

•Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.725
SparrowsPt.(39) B2 ..9.725

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.00
Irvin,Pa. U5 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland (28) R2 ...7.425
Niles,O. (28) R2 ....7.425
Weirton,W.Va. W6 ..7.275

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1).9.25
Butler,Pa. A10 (type 2).9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.625
Cleveland R2 .....6.625
Gary,Ind. U5 .....6.625
GraniteCity,Ill. G4 ....6.825
Ind.Harbor,Ind. I-2,Y1 6.625
Irvin,Pa. U5 .....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 ....6.625
Youngstown Y1 .....6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.65
Ind.Harbor,Ind. I-2 ..8.475
Yorkville,O. W10 ....8.475

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.00
Gary,Ind. U5 .....7.00
Mansfield,O. E6 .....7.00
Middletown,O. A10 ....7.00
Niles,O. M21, S3 .....7.00
Warren,O. R2 .....7.00
Weirton,W.Va. W6 ....7.00

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.40

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve.Cold Rolling Mills
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D3 Dearborn Div., Sharon Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md.Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelson Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Div. Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.925
Allenport,Pa. P7 .....4.925
Alton,Ill. L1 .....5.125
Ashland,Ky.(8) A10 ..4.925
Atlanta A11 .....5.125
Bessemer,Ala. T2 ....4.925
Birmingham C15 .....4.925
Buffalo (27) R2 .....4.925
Conshohocken,Pa. A3 ..4.975
Detroit M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fontana, Calif. K1 ....5.825
Gary,Ind. U5 .....4.925
Ind.Harbor,Ind. I-2, Y1 4.925
Johnstown,Pa. (25) B2 .4.925
Lackaw'na,N.Y.(25) B2 4.925
LosAngeles(25) B3 ....5.675
Minnequa,Colo. C10 ..6.025
Pittsburg,Calif. C11 ..5.675
Riverdale,Ill. A1 .....4.925
SanFrancisco S7 .....6.35
Seattle(25) B3 .....6.35
Seattle N14 .....6.35
Sharon,Pa. S3 .....4.925
S.SanFrancisco(25) B3 5.675
SparrowsPoint,Md. B2 4.925
Sterling,Ill. (1) N15 ..4.925
Sterling,Ill. N15 .....5.025
Torrance,Calif. C11 ..5.675
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ...4.925
Youngstown U5 .....4.925

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.10
Farrell,Pa. S3 .....8.10
Gary,Ind. U5 .....8.10
Houston S5 .....8.35
Ind.Harbor,Ind. Y1 ....8.10
KansasCity,Mo. S5 ....8.35
LosAngeles B3 .....9.30
Lowellville,O. S3 .....8.10
Newport,Ky. A2 .....8.10
Sharon, Pa. A2 .....8.10
S.Chicago,Ill. W14 ....8.10
Youngstown U5, Y1 ..8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2 ....7.325
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.425
Fairfield,Ala. T2 ....7.325
Farrell,Pa. S3 .....7.325
Gary,Ind. U5 .....7.325
Ind.Harbor,Ind. I-2, Y1 7.325
Lackawanna,N.Y. B2..7.325
LosAngeles(25) B3 ....8.075
Seattle(25) B3 .....8.325
Sharon,Pa. S3 .....7.325
S.Chicago,Ill. W14 ....7.325
S.SanFrancisco(25) B3.8.075
SparrowsPoint,Md. B2..7.325
Warren,O. R2 .....7.325
Weirton,W.Va. W6 ....7.325
Youngstown U5, Y1 ..7.325

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..5.175
Warren,O. R2 .....5.675

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.15
Baltimore T6 .....7.15
Boston T6 .....7.70
Buffalo S40 .....7.15
Cleveland A7, J5 .....7.15
Conshohocken,Pa. A3 ..7.20
Dearborn,Mich. D3 ....7.25
Detroit D2, M1, P20 ...7.25
Dover,O. G6 .....7.15
Ecorse,Mich. G5 .....7.25
Evanston,Ill. M22 .....7.25
Follansbee,W.Va. F4 ...7.15
Fontana,Calif. K1 ....9.00
Franklin Park,Ill. T6 ..7.25
Ind.Harbor,Ind. Y1 ....7.15
Indianapolis J5 .....7.30
LosAngeles J5 .....9.05
LosAngeles C1 .....9.20
NewBedford,Mass. R10..7.60
NewBritain(10) S15 ....7.15
NewCastle,Pa. B4, E5 ..7.15
NewHaven,Conn. D2 ....7.60
NewKensington,Pa. A6..7.15
Pawtucket,R.I. R3 ....7.80
Pawtucket,R.I. N8 ....7.70
Philadelphia(45) P24 ...7.70
Pittsburgh J5 .....7.15
Riverdale,Ill. A1 .....7.25
Rome,N.Y. (32) R6 ....7.15
Sharon,Pa. S3 .....7.15
Trenton,N.J. (31) R5..8.60
Wallingford,Conn. W2 ..7.60
Warren,O. R2, T5 ....7.15
Weirton,W.Va. W6 ....7.15
Worcester,Mass. A7 ....7.70
Youngstown J5, Y1 ....7.15

STRIP, Cold-Rolled Alloy

Boston T6 .....15.40
Carnegie,Pa. S18 .....15.05
Cleveland A7 .....15.05
Dover,O. G6 .....15.05
Farrell,Pa. S3 .....15.05
FranklinPark,Ill. T6 ..15.05
Harrison,N.J. C18 ....15.05
Indianapolis J5 .....15.20
Lowellville,O. S3 .....15.05
Pawtucket,R.I. N8 ....15.40
Riverdale,Ill. A1 .....15.05
Sharon,Pa. S3 .....15.05
Worcester,Mass. A7 ...15.35
Youngstown J5 .....15.05

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.45
Dearborn,Mich. D3 ....10.60
Dover,O. G6 .....10.45
Ecorse,Mich. G5 .....10.55
Farrell,Pa. S3 .....10.50
Ind.Harbor,Ind. Y1 ...10.65
Sharon,Pa. S3 .....10.50
Warren,O. R2 .....10.45
Weirton,W.Va. W6 ....10.50
Youngstown Y1 .....10.65

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....7.90

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.15*
Dover,O. G6 .....7.15*
Evanston,Ill. M22 .....7.25*
Riverdale,Ill. A1 .....7.25*
Warren,O. B9, T5 ....7.15*
Worcester,Mass. A7 ...7.70*
Youngstown J5 .....7.15*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....7.275

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Riverdale,Ill. A1 .....5.50
Sharon,Pa. S3 .....5.35
Youngstown U5 .....5.35

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	..	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	....	....
Fostoria,O. S1	10.05	11.15	13.10	16.10	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles J5	11.15	12.60	14.80	....	....
NewBritain,Conn.(10) S15	8.95	10.40	12.60	15.60	18.55
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	16.10	19.30
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	18.10	21.95	26.30
Buffalo W12	...	...	18.10	....	....
Fostoria,O. S1	...	...	18.30	22.15	....
FranklinPark,Ill. T6	...	...	18.45	22.30	26.65
Harrison,N.J. C18	...	...	18.10	21.95	26.30
NewYork W3	...	...	18.10	21.95	26.30
Palmer,Mass. W12	...	...	18.10	....	....
Trenton,N.J. R5	...	...	18.10	21.95	26.30
Worcester,Mass. A7, T6	...	...	18.10	21.95	26.30
Youngstown J5	...	...	18.45	22.30	26.65

SILICON STEEL

H.R.SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	11.80	12.90	13.95
Mansfield,O. E6	9.625	11.10	11.80	12.90	13.95
Newport,Ky. A2	9.625	11.10	11.80	12.90	13.95
Niles,O. M21, S3	9.625	11.10	11.80	12.90	....
Vandergrift,Pa. U5	....	11.10	11.80	12.90	13.95
Warren,O. R2	9.625	11.10	11.80	12.90	....
Zanesville,O. A10	....	11.10	11.80	12.90	13.95
Zanesville,O. A10 (SP Coils)	....	....	11.55	12.65	13.70

C.R. COILS & CUT LENGTHS (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10.	....	11.35	12.05	13.15	14.20
Brackenridge,Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	9.825*	11.05*	11.75*	12.85*	....
IndianaHarbor,Ind. I-2	9.625*	10.85*	11.55*	12.65*	....
Mansfield,O. E6	9.625*	11.35	12.05	13.15	14.20
Vandergrift,Pa. U5	9.625*	11.35	12.05	13.15	14.20
Warren,O. R2	9.625*	11.35	12.05	13.15	14.20
Zanesville,O. A10(FP Coils)	...	11.35	12.05	13.15	14.20

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.00	15.55	16.05	17.10
Vandergrift,Pa. U5	14.75	15.55	16.05	17.10
Zanesville,O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	17.60	19.20	19.70	20.20	....
Butler,Pa. A10	....	....	....	19.20	19.70	20.20
Vandergrift,Pa. U5	16.60	17.60	19.20	19.70	20.20	15.25**
Warren,O. R2	....	....	....	....	....	15.25‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.05	$10.30
Fairfield,Ala. T2	10.15	10.40
Fairless,Pa. U5	10.15	10.40
Fontana,Calif. K1	10.80	11.05
Gary,Ind. U5	10.05	10.30
Irvin,Pa. U5	10.05	10.30
Pitts.,Calif. C11	10.80	11.05
Sp.Pt.,Md. B2	10.15	10.40
Weirton,W.Va. W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$7.85
Fairfield,Ala. T2 .....7.95
Fairless,Pa. U5 .....7.95
Fontana,Calif. K1 ....8.60
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 ....7.95
Ind.Harbor,Ind. I-2, Y1.7.85
Irvin,Pa. U5 .....7.85
Niles,O. R2 .....7.85
Pittsburg,Calif. C11 ...8.60
SparrowsPoint,Md. B2..7.95
Weirton,W.Va. W6 ....7.85
Yorkville,O. W10 .....7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5 ....$7.50
Gary,Ind. U5 .....7.50
GraniteCity,Ill. G4 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Irvin,Pa. U5 .....7.50
Yorkville,O. W10 .....7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5 .....$9.70
Irvin,Pa. U5 .....9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5 .....$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..7.65
Aliquippa,Pa. J5 .....7.65
Alton,Ill. L1 .....7.85
Atlanta A11 .....7.85
Bartonville,Ill. K4 ....7.75
Buffalo W12 .....7.65
Chicago W13 .....7.65
Cleveland A7, C20 ....7.65
Crawfordsville,Ind. M8..7.75
Donora,Pa. A7 .....7.65
Duluth A7 .....7.65
Fairfield,Ala. T2 .....7.65
Fostoria,O.(24) S1 ....7.75
Houston S5 .....7.90
Jacksonville,Fla. M8 ..8.00
Johnstown,Pa. B2 ....7.65
Joliet,Ill. A7 .....7.65
KansasCity,Mo. S5 ....7.90
Kokomo,Ind. C16 .....7.75
LosAngeles B3 .....8.60
Minnequa,Colo. C10 ....7.90
Monessen,Pa. P7, P16 ..7.65
N.Tonawanda,N.Y. B11 7.65
Palmer,Mass. W12 ....7.95
Pittsburg,Calif. C11 ...8.60
Portsmouth,O. P12 ....7.65
Rankin,Pa. A7 .....7.65
S.Chicago,Ill. R2 .....7.65
S.SanFrancisco C10 ...8.60
SparrowsPoint,Md. B2..7.75
Sterling,Ill.(1) N15 ....7.65
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....7.65
Waukegan,Ill. A7 .....7.65
Worcester,Mass. A7 ....7.95

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....12.65
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 ....12.65
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P16 ....12.65
Muncie,Ind. I-7 .....12.85
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 ....12.95
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ...12.75
Struthers,O. Y1 .....12.65
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.30
Alton,Ill. L1 .....9.50
Buffalo W12 .....9.30
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 ....9.55
LosAngeles B3 .....10.25
Minnequa,Colo. C10 ....9.50
Monessen,Pa. P7, P16 ..9.30
NewHaven,Conn. A7 ....9.60
Palmer,Mass. W12 ....9.60
Pittsburg,Calif. C11 ...10.25
Portsmouth,O. P12 ....9.30
Roebling,N.J. R5 .....9.60
S.Chicago,Ill. R2 .....9.30
S.SanFrancisco C10 ...10.25
SparrowsPt.,Md. B2 ...9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.60
Worcester,Mass. A7 ....9.60

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....9.30
Alton,Ill. L1 .....9.50
Bartonville,Ill. K4 ....9.40
Buffalo W12 .....9.30
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Fostoria,O. S1 .....9.35
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 ....9.55
LosAngeles B3 .....10.25
Milbury,Mass.(12) N6 ..9.60
Minnequa,Colo. C10 ....9.50
Monessen,Pa. P7, P16..9.30
Muncie,Ind. I-7 .....9.50
Palmer,Mass.(12) W12 .9.60
Pittsburg,Calif. C11 ...10.25
Portsmouth,O. P12 ....9.30
Roebling,N.J. R5 .....9.60
S.Chicago,Ill. R2 .....9.30
S.SanFrancisco C10 ...10.25
SparrowsPt.,Md. B2 ...9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.60
Worcester,A7, J4, T6 ..9.60

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....15.80
Bartonville,Ill. K4 ....15.70
Buffalo W12 .....15.60
Chicago W13 .....15.60
Cleveland A7 .....15.60
Crawfordsville,Ind. M8..15.70
Fostoria,O. S1 .....15.60
Houston S5 .....15.85
Jacksonville,Fla. M8 ..15.95
Johnstown,Pa. B2 .....15.60
KansasCity,Mo. S5 ....15.85
Kokomo,Ind. C16 .....15.60
Minnequa,Colo. C10 ....15.85
Monessen,Pa. P7, P16..15.60
Muncie,Ind. I-7 .....15.80
Palmer,Mass. W12 .....15.90
S.SanFrancisco C10 ...16.45
Waukegan,Ill. A7 .....15.60
Worcester,Mass. A7, T6 15.90

ROPE WIRE

Bartonville,Ill. K4 ....12.75
Buffalo W12 .....12.75
Fostoria,O. S1 .....12.75
Johnstown,Pa. B2 .....12.75
Monessen,Pa. P7 .....12.75
Muncie,Ind. I-7 .....12.95
Palmer,Mass. W12 ....13.05
Portsmouth,O. P12 ....12.75
Roebling,N.J. R5 .....13.05
SparrowsPt.,Md. B2 ...12.85
Struthers,O. Y1 .....12.75
Worcester,Mass. J4 ....13.05
(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Tire Bead

Bartonville,Ill. K4	....16.55
Monessen,Pa. P16	....16.55
Roebling,N.J. R5	....17.05

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	....11.65
Baltimore T6	.....11.95
Boston T6	.....11.95
Buffalo W12	.....11.65
Chicago W13	.....11.75
Cleveland A7	.....11.65
Crawfordsville,Ind. M8	.11.65
Dover,O. G6	.....11.65
Fostoria,O. S1	.....11.65
FranklinPark,Ill. T6	..11.75
Kokomo,Ind. C16	....11.65
Massillon,O. R8	.....11.65
Milwaukee C23	.....11.85
Monessen,Pa. P7, P16	..11.65
Palmer,Mass. W12	....11.95
Pawtucket,R.I. N8	....11.95
Philadelphia P24	.....11.95
Riverdale,Ill. A1	.....11.75
Rome,N.Y. R6	.....11.65
Sharon,Pa. S3	.....11.65
Trenton,N.J. R5	.....11.95
Warren,O. B9	.....11.65
Worcester,Mass. A7, T6	11.95

NAILS, Stock **Col.**

AlabamaCity,Ala. R2	..173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	..175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla.(20) M8	.184
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	...$9.10

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	..$9.80
Wheeling,W.Va. W10	...9.80

POLISHED STAPLES **Col.**

AlabamaCity,Ala. R2	...175
Aliquippa,Pa. J5	175
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	..177
Donora,Pa. A7	175
Duluth A7	175
Fairfield,Ala. T2	175
Jacksonville,Fla.(20) M8	186
Johnstown,Pa. B2	175
Joliet,Ill. A7	175
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	175
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	.$10.26
Atlanta A11	.....10.36
Bartonville,Ill. K4	....10.36
Buffalo W12	.....10.26
Chicago W13	.....10.26
Crawfordsville,Ind. M8	.10.36
Donora,Pa. A7	.....10.26
Duluth A7	.....10.26
Fairfield,Ala. T2	....10.26
Houston S5	.....10.51
Jacksonville,Fla. M8	..10.82
Johnstown,Pa. B2	....10.26
Joliet,Ill. A7	.....10.26
KansasCity,Mo. S5	....10.51
Kokomo,Ind. C16	.....10.36
LosAngeles B3	.....11.05
Minnequa,Colo. C10	...10.51
Pittsburg,Calif. C11	..11.04
S.Chicago,Ill. R2	.....10.26
S.SanFrancisco C10	...11.04
SparrowsPt.,Md. B2	..10.36
Sterling,Ill.(37) N15	..10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	.$10.60
Atlanta A11	.....10.70
Bartonville,Ill. K4	....10.70
Buffalo W12	.....10.60
Chicago W13	.....10.60
Crawfordsville,Ind. M8	.10.70
Donora,Pa. A7	.....10.60
Duluth A7	.....10.60
Fairfield,Ala. T2	.....10.60
Houston S5	.....10.85
Jacksonville,Fla. M8	..11.16
Johnstown,Pa. B2	....10.60
Joliet,Ill. A7	.....10.60
KansasCity,Mo. S5	....10.85
Kokomo,Ind. C16	....10.70
LosAngeles B3	.....11.40
Minnequa,Colo. C10	..10.85
Pittsburg,Calif. C11	..11.40
S.Chicago,Ill. R2	.....10.60
S.SanFrancisco C10	..11.40
SparrowsPt.,Md. B2	..10.70
Sterling,Ill.(37) N15	..10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	.$10.65
Atlanta A11	.....10.75
Bartonville,Ill. K4	....10.75
Buffalo W12	.....10.65
Chicago W13	.....10.65
Crawfordsville,Ind. M8	.10.75
Donora,Pa. A7	.....10.65
Duluth A7	.....10.65
Fairfield,Ala. T2	.....10.65
Houston S5	.....10.90
Jacksonville,Fla. M8	..11.21
Johnstown,Pa. B2	....10.65
Joliet,Ill. A7	.....10.65
KansasCity,Mo. S5	....10.90
Kokomo,Ind. C16	....10.75
LosAngeles B3	.....11.45
Minnequa,Colo. C10	...10.90
Pittsburg,Calif. C11	..11.45
S.Chicago,Ill. R2	.....10.65
S.SanFrancisco C10	..11.45
SparrowsPt.,Md. B2	...10.75
Sterling,Ill.(37) N15	..10.75

BALE TIES, Single Loop **Col.**

AlabamaCity,Ala. R2	..212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	..214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	...219
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214
Williamsport,Pa. S19	175

FENCE POSTS

Birmingham C15	171
ChicagoHts.,Ill. C2, I-2	..172
Duluth A7	172
Franklin,Pa. F5	172
Huntington,W.Va. C15	..171
Johnstown,Pa. B2	172
Marion,O. P11	172
Minnequa,Colo. C10	177
Sterling,Ill.(1) N15	172
Tonawanda,N.Y. B12	..174

WIRE, Barbed **Col.**

AlabamaCity,Ala. R2	..193**
Aliquippa,Pa. J5	.....190§
Atlanta A11	.....198*
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	..198
Donora,Pa. A7	.....193†
Duluth A7	.....193†
Fairfield,Ala. T2	.....193†
Houston S5	.....198**
Jacksonville,Fla. M8	...203
Johnstown,Pa. B2	.....196§
Joliet,Ill. A7	.....193†
KansasCity,Mo. S5	....198**
Kokomo,Ind. C16	.....195†
Minnequa,Colo. C10	....198**
Monessen,Pa. P7	.....196*
Pittsburg,Calif. C11	....213†
Rankin,Pa. A7	.....193†
S.Chicago,Ill. R2	.....193**
S.SanFrancisco C10	..213**
SparrowsPoint,Md. B2	..198§
Sterling,Ill.(7) N15	....198§

WOVEN FENCE, 9-15 Ga. **Col.**

Ala.City,Ala. R2	....187**
Aliq'ppa,Pa.9-14½ga.J5	190§
Atlanta A11	.....192*
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	..192
Donora,Pa. A7	.....187†
Duluth A7	.....187†
Fairfield,Ala. T2	.....187†
Houston S5	.....192**
Jacksonville,Fla. M8	...197
Johnstown,Pa.(43) B2	..190§
Joliet,Ill. A7	.....187†
KansasCity,Mo. S5	....192**
Kokomo,Ind. C16	.....189†
Minnequa,Colo. C10	....192**
Pittsburg,Calif. C11	....210†
Rankin,Pa. A7	.....187†
S.Chicago,Ill. R2	.....187**
Sterling,Ill.(7) N15	....192§

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.15	18.70**
Aliq'ppa,Pa. J5	17.15	18.95
Bartonville K4	..17.25	19.05
Cleveland A7	...17.15	....
Crawf'dsville M8	17.25	19.05
Fostoria,O. S1	..17.65	19.20†
Houston S5	...17.40	18.95**
Jacksonville M8	17.50	19.30
Johnstown B2	..17.15	18.95§
Kan.City,Mo. S5	17.40	....
Kokomo C16	..17.25	18.80†
Minnequa C10	..17.40	18.95**
P'lm'r,Mass. W12	17.45	19.00†
Pitts.,Calif. C11	17.50	19.05†
SparrowsPt. B2	..17.25	19.05§
Sterling(37) N15	..17.25	19.05§
Waukegan A7	..17.15	18.70†
Worcester A7	..17.45	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	8.65 9.20**
Aliquippa J5	....8.65 9.325§
Atlanta(48) A11	..8.75 9.425*
Bartonville(48) K4	8.75 9.425
Buffalo W12	....8.65 9.20†
Cleveland A7	....8.65 ....
Crawfordsville M8	8.75 9.425
Donora,Pa. A7	..8.65 9.20†
Duluth A7	.....8.65 9.20†
Fairfield T2	.....8.65 9.20†
Houston(48) S5	8.90 9.45**
Jacks'ville,Fla. M8	9.00 9.675
Johnstown B2(48)	8.65 9.325§
Joliet,Ill. A7	....8.65 9.20†
Kans.City(48) S5	8.90 9.45**
Kokomo C16	.....8.75 9.30†
LosAngeles B3	..9.60 10.275§
Minnequa C10	..8.90 9.45**
Monessen P7(48)	..8.65 9.25*
Palmer,Mass. W12	8.95 9.50†
Pitts.,Calif. C11	..9.60 10.15†
Rankin,Pa. A7	..8.65 9.20†
S.Chicago R2	....8.65 9.20**
S.SanFran. C10	..9.60 10.15**
Spar'wsPt.B2(48)	8.75 9.425§
Sterling(48) N15	..8.90 9.575§
Sterling(1)(48)	..8.80 9.475§
Struthers,O.(48)Y1	8.65 9.30†
Worcester,Mass.A7	8.95 9.50†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter....	49.0
Longer than 6 in. ..	39.0
⅝ in. thru 1 in.:	
6 in. and shorter...	39.0
Longer than 6 in. ..	35.0
1⅛ in. and larger:	
All lengths	35.0
Undersized Body (rolled thread)	
½ in. and smaller:	
6 in. and shorter..	49.0

Carriage, Machine, Lag Bolts
Hot Galvanized:

½ in. and smaller:	
6 in. and shorter..	29.0
Longer than 6 in. ..	15.0
⅝ in. and larger:	
All lengths	12.0

Lag Bolts (all diam.)

6 in. and shorter..	49.0
Longer than 6 in. ..	39.0

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	49.0
Larger than ½ in. or longer than 6 in. ..	39.0

Blank Bolts 39.0
Step, Elevator, Tire Bolts 49.0
Stove Bolts, Slotted:

⅛ to ¼ in. incl., 3 in. and shorter.	55.0
⅛ to ½ in., inclusive	55.0

NUTS

Reg. & Heavy Square Nuts:
All sizes 55.5
Square Nuts, Reg. &
Heavy, Hot Galvanized:
All sizes 41.0
Hex Nuts, Reg. &
Heavy, Hot Pressed:

⅛ in. and smaller..	60.5
⅞ in. to 1 in., incl.	55.5
1⅛ in. to 1½ in., incl.	58.5
1⅝ in. and larger..	53.5

Hex Nuts, Reg. &
Heavy, Cold Punched:

⅛ in. and smaller..	60.5
⅞ in. to 1¼ in., incl.	55.5
1⅝ in. and larger..	53.5

Hex Nuts, All Types,
Hot Galvanized:

⅛ in. and smaller..	46.5
⅞ in. to 1 in., incl.	41.5
1⅛ in. to 1½ in., incl.	46.5

Hex Nuts, Semifinished,
Heavy (Incl. Slotted):

¾ in. and smaller..	60.5
⅞ in. to 1⅛ in., incl.	55.5
1⅝ in. and larger..	53.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller..	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger..	53.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller..	60.5
¾ in. to 1 in., incl.	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger..	53.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)
Hex Head Capscrews, Coarse or Fine Thread, Bright:

6 in. and shorter:	
½ in. and smaller..	40.0
¾, ⅞, and 1 in. diam.	22.0
Longer than 6 in.:	
½ in. and smaller..	8.0
¾, ⅞, and 1 in. diam.	+6.0

High Carbon, Heat Treated:

6 in. and shorter:	
½ in. and smaller..	26.0
¾, ⅞, and 1 in. diam.	3.0
Longer than 6 in.:	
½ in. and smaller..	+13.0
¾, ⅞, and 1 in. diam.	+32.0

Flat Head Capscrews:
½ in. and smaller.. +76.0
Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:
6 in. and shorter... Net
Longer than 6 in... +23

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½ in., larger 12.25
7/16 in. under: List less 19%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	25.98	23.54
1¼	13	....	30.78	23.36
1½	13	29.03	34.01	25.83
1¾	13	34.29	40.18	30.51
2	13	38.44	45.06	34.20
2¼	13	43.29	50.75	38.52
2¼	12	46.99	55.06	41.81
2½	12	51.76	60.65	46.05
2¾	12	56.04	65.67	49.88
3	12	59.76	70.03	53.19

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	6.50
Gary,Ind. U5	5.525	5.425	....	....
Huntington,W.Va. C15	....	....	....	6.50
IndianaHarbor,Ind. I-2	5.525	5.425	5.475	....
Johnstown,Pa. B2	....	....	...(16)	6.50
Lackawanna,N.Y. B2	5.525	5.425	....	6.50
Minnequa,Colo. C10	5.525	5.425	....	7.00
Steelton,Pa. B2	5.525	5.425	....	....
Williamsport,Pa. S19	....	....	....	6.50

TIE PLATES

Fairfield,Ala. T2	.....6.60
Gary,Ind. U5	.....6.60
Ind.Harbor,Ind. I-2	.....6.60
Lackawanna,N.Y. B2	..6.60
Minnequa,Colo. C10	....6.60
Seattle B3	.....6.75
Steelton,Pa. B2	.....6.60
Torrance,Calif. C11	....6.75

JOINT BARS

Bessemer,Pa. U5	.....6.975
Fairfield,Ala. T2	.....6.975
Ind.Harbor,Ind. I-2	...6.975
Joliet,Ill. U5	.....6.975
Lackawanna,N.Y. B2	..6.975
Minnequa, Colo. C10	..6.975
Steelton,Pa. B2	.....6.975

AXLES

Ind.Harbor,Ind. S13	...8.775
Johnstown, Pa. B2	....8.775

TRACK BOLTS, Untreated

Cleveland R2	.....14.75
KansasCity,Mo. S5	....14.75
Lebanon,Pa. B2	.....14.75
Minnequa,Colo. C10	...14.75
Pittsburgh P14	.....14.75
Seattle B3	.....15.25

SCREW SPIKES
Lebanon,Pa. B2 .....14.50

STANDARD TRACK SPIKES

Fairfield, Ala. T2	.....9.75
Ind.Harbor,Ind. I-2, Y1	9.75
KansasCity,Mo. S5	...9.75
Lebanon,Pa. B2	.....9.75
Minnequa,Colo. C10	....9.75
Pittsburgh J5	.....9.75
Seattle B3	.....10.25
S.Chicago,Ill. R2	.....9.75
Struthers,O. Y1	.....9.75
Youngstown R2	.....9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 3 cols. lower.
(8) 13 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 10 per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone,6.045c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.60c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(45) 0.022 in. and lighter, over 0.022", 8.30c.
(46) Special quality.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.30c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Ambridge, Pa. N2	+9.25	....	+2.75	....	+0.25	....	1.25	....	1.25	....	1	....	3.5	....
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		5c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Alton, Ill. L1	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Benwood, W. Va. W10	4.5	+22	+7.5	+31	+18	+39.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Butler, Pa. F6	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sparrows Pt., Md. B2	3.5	+23	+8.5	+32	+19	+40.5	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Wheatland, Pa. W9	5.5	+21	+6	+30	+17	+38.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Alton, Ill. L1	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Fontana, Calif. K1	1.25	+13.25	1.75	+12.75	3.25	+13	3.25	+13	+7.25	+24	+7.25	+24
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	15.75	+0.5	15.25	+0.5	5.25	+11.5	5.25	+11.5
Lorain, O. N3	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sharon, Pa. M6	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sparrows Pt., Md. B2	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Wheatland, Pa. W9	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling: Ingot	Rerolling: Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	....	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	46.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	....	45.50	48.00	50.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	50.75	55.50	55.50
304L	....	....	48.25	51.50	53.00	55.50	58.50	63.25	63.25
305	28.50	36.75	42.50	47.50	45.25	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	....	....	86.50	....	92.75	....	104.50
316	39.75	49.50	62.25	69.25	69.25	73.00	76.75	81.50	81.50
316L	....	....	70.00	76.50	77.00	80.75	84.50	89.25	89.25
317	48.00	60.00	76.75	88.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	59.75	65.50	65.50
330	....	....	106.75	....	106.75	106.75	105.50	108.00	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	35.75	37.75	40.25	48.25	48.25
405	19.50	25.50	29.75	36.00	33.50	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	36.25	48.25	48.25
420	....	33.50	34.25	41.75	39.25	41.25	45.25	62.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	36.75	51.75	51.75
431	....	28.75	37.75	....	42.00	44.25	46.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co., Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Uibrich Stainless Steels Inc.; U. S. Steel Corp.; Universal-Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel Co., subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.

Clad Steel

	Plates: Carbon Base 5%	10%	15%	20%	Sheets: Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	34.70	37.95	42.25	46.70	40.00
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.40	49.50	54.50	58.75
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.95	40.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.305	Cr-Hot Work	0.475
Extra Carbon	0.360	W-Cr Hot Work	0.500
Special Carbon	0.475	V-Cr Hot Work	0.520
Oil Hardening	0.475	Hi-Carbon-Cr	0.925

Grade by Analysis (%)

W	Cr	V	Co	Mo		$ per lb
20.25	4.25	1.6	12.25	...	.....	4.285
18.25	4.25	1	4.75	...	.....	2.500
18	4	2	9	...	.....	2.870
18	4	2	....	...	.....	1.960
18	4	1	....	...	.....	1.795
9	3.5	..	....	...	.....	1.395
13.5	4	3	....	...	.....	2.060
13.75	3.75	2	5	...	.....	2.440
6.4	4.5	1.9	....	5	.....	1.300
6	4	3	....	6	.....	1.545
1.5	4	1	....	8.5	.....	1.155

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal transportation tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity,Ala. R2	62.00	62.50	....	....
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	....	66.50	....
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.62	69.12	69.12	69.62
Muskegon,Mich., deld.	....	74.12	74.12	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.12	69.62	69.62	70.12
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.10	75.60	....
Newark,N.J., deld.	72.29	72.79	73.29	73.79
Philadelphia, deld.	70.01	70.51	71.01	71.59
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	67.00
Mansfield,Ohio, deld.	70.90	....	71.40	71.90
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	67.50	68.00	68.50	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.54	73.04	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry, $9 freight alowed K2	103.50
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Troy,N.Y. R2 (Phos. 0.035% max)	74.00
Philadelphia, deld.	82.27
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents: Atlanta, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	8.59‖	9.86‖	....	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	8.28	8.88	9.61	....	8.76	9.06	11.34#	15.18	9.19	8.66	10.14
Birmingham	8.18	9.45	11.07	....	8.23	8.60	10.57	....	8.64	8.56	10.70
Boston	9.38	10.44	11.45	53.50	9.42	9.73	12.90#	15.28	9.63	9.72	11.20
Buffalo	8.40	9.00	10.07	55.98	8.50	8.80	10.90#	15.00	8.90	8.90	10.45
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.20	9.45	10.00	53.00	8.23	8.60	8.80	14.65	8.64	8.56	9.88
Cincinnati	8.34	9.48	10.05	52.43	8.54	8.92	9.31	14.96	9.18	8.93	10.21
Cleveland	8.18	9.45	9.95	55.68	8.33	8.69	10.80#	14.74	9.01	8.79	10.11
Dallas	8.85	10.15	....	....	9.00	8.95	11.01	....	9.00	9.45	10.70
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	9.82	9.74	11.06
Detroit	8.43	9.70	10.35	56.50	8.58	8.90	9.15	14.91	9.18	8.91	10.13
Erie, Pa.	8.20	9.45	9.95[10]	....	8.50	8.75	9.05[10]	....	9.00	8.85	10.10
Houston	8.45	9.75	8.45	....	8.60	8.55	11.10	....	8.60	9.05	10.30
Jackson, Miss.	8.52	9.79	....	....	8.57	8.94	10.68	....	8.97	8.90	10.74
Los Angeles	9.50	10.75	11.65	57.60	9.50	9.80	12.75	....	9.10	9.55	11.70
Milwaukee	8.33	9.58	10.13	....	8.36	8.73	9.03	14.78	8.85	8.69	10.01
Moline, Ill.	8.55	9.80	10.35	....	8.58	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	10.56	53.08	9.31	9.57	12.76#	15.09	9.35	9.43	10.71
Norfolk, Va.	8.05	....	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.00	8.90	9.87	51.94	8.69	8.65	11.51#	15.01	8.50	8.77	9.77**
Pittsburgh	8.18	9.45	10.35	52.00	8.33	8.60	10.80#	14.65	8.64	8.56	9.88
Portland, Oreg.	8.50	11.20	11.55	57.38	9.55	8.65	14.65#	15.95	8.65	8.30	11.50
Richmond, Va.	8.45	....	10.40	....	9.15	9.15	....	....	9.40	8.85	10.35
St. Louis	8.54	9.79	10.36	....	8.59	8.97	9.41	15.01	9.10	8.93	10.25
St. Paul	8.79	10.04	10.61	....	8.84	9.21	9.66	....	9.38	9.30	10.49
San Francisco	9.35	10.75	11.00	55.10	9.45	9.70	13.00	16.10	9.50	9.60	12.00
Seattle	9.95	11.15	12.00	57.38	10.00	10.10	14.05	16.35	9.80	9.70	12.10
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	9.95	11.15	12.00	57.38	10.00	10.10	14.05	17.20	9.80	9.70	12.10
Washington	8.48	9.58	....	....	9.06	9.15	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **¼ in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.; #1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; [8]—400 to 9999 lb; [9]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Oliver Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, Ohio, $138; Cutler, Utah, $165.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., $150; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfied, Pa., $140; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ⅛ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-41; 70%, $36.40; 60%, $33-36.50. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $33-34; Mexican, all rail, duty paid, $25.25-25.75; barge, Brownsville, Tex., $27.25-27.75.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi River, ocean bags 23,000 lb and over..	10.50
F.o.b. Riverton or Camden, N. J., west of Mississippi River.	9.50
Sponge Iron, Domestic, 98 + % Fe: Deld. east of Mississippi River, 23,000 lb and over	10.50
F.o.b. Riverton, N. J., west of Mississippi River	9.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.00
Annealed, 99.5% Fe..	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)..	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	

	Dollars
Aluminum: Atomized, 500 lb drum, freight allowed Carlots	39.50
Ton lots	41.50
Antimony, 500 lb lots	42.00*
Brass, 5000-lb lots .....31.30-38.40†	
Bronze, 5000-lb lots .....48.10-52.70†	
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed ..	$1.065
Nickel-Silver, 5000-lb lots .....49.20-61.30†	
Phosphor-Copper, 5000-lb lots	59.80
Copper (atomized) 5000-lb lots .....40.30-48.80‡	
Silicon 47.50	
Solder	7.00*
Stainless Steel, 304 ..	$1.02
Stainless Steel, 316 ..	$1.20
Tin 14.50*	
Zinc, 5000-lb lots 17.50-30.70‡	
Tungsten: Melting grade, 99%	Dollars
60 to 200 mesh: 1000 lb and over ..	3.15
Less than 1000 lb ..	3.30
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam	Length	Per 100 lb
2	24	$60.75
2½	30	39.25
3	40	37.00
4	40	35.00
5⅛	40	34.75
6	60	31.50
7	60	28.25
8, 9, 10	60	28.00
12	72	26.75
14	60	26.75
16	72	25.75
17	60	26.25
18	72	26.25
20	72	25.25
24	84	26.00

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305...	$6.28	$6.23	$6.23	$6.48
Bar Size Angles	6.62	6.57	6.57	6.75
Structural Angles	6.62	6.57	6.57	6.75
I-Beams	6.87	6.82	6.82	7.00
Channels	6.87	6.82	6.82	7.00
Plates (basic bessemer)	8.35	8.30	8.30	8.60
Sheets, H.R.	8.25	8.20	8.20	8.50
Sheets, C. R. (drawing quality)	9.00	8.95	8.95	9.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	26.79	26.67	26.67	27.36
Barbed Wire (†)	6.95	6.95	6.95	7.40
Merchant Bars	6.87	6.82	6.82	7.22
Hot-Rolled Bands	7.20	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.73	6.73	6.73	7.13
Wire Rods, O.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails (§)	8.38	8.38	8.38	8.58

†Per 82 lb. net. reel. §Per 100-lb kegs, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	28.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$13.00-14.00*
Domestic, concentrates f.o.b. milling points	20.00-22.00

*Before duty.

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.39-1.42 per long ton unit, c.i.f. U. S. ports, duty for buyer's account: other than Indian, nomnial; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$51.00-53.00
48% 2.8:1	48.00-50.00
48% no ratio	41.00-43.00

South African Transvaal

48% no ratio	$40.00-41.00
44% no ratio	30.00-30.50

Turkish

48% 3:1	$55.00-57.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.50-2.60
60-65%	2.60-2.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.25
Saginaw, Mich., deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens: New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, Ohio, ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Neville Island (Pittsburgh), Pa., ovens.	29.25
Painesville, Ohio, ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
St. Paul, ovens	29.75
Chicago, deld.	33.24
Swedeland, Pa., ovens	29.50
Terre Haute, Ind. ovens	29.75

*Or within $4.85 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	29.50
Industrial xylene	32.00-34.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00-34.00

Cents per pound, producing point

Phenol: Grade 1, 17.50; Grade 2-3, 15.50; Grade 4, 17.50; Grade 5, 16.50; Grade 6, 14.50.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton; $245, Johnstown, Duquesne, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered, Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c; less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk. C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.

Cr 67.71%, carload, lump, bulk, C 0.02% max, 41.00c per lb contained Cr; 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 30.05c per lb of contained Cr. Packed, c.l. 31.65c, ton 33.45c, less ton 34.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 21.25c, per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 27.50c per lb contained Cr, 14.20c per lb contained Si. 0.75" x down, 28.65c per lb contained Cr, 14.20c per lb contained Si. Delivered.

Chromium Metal Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract less carload lot, packed $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 14.20c per lb of contained Si. Packed c.l. 16.70c, ton lot 18.15c, less ton 19.80c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 22.00c per lb of Si. Packed, c.l. 23.65c, ton lot 24.95c, less ton 25.95c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 1% Fe grade analyzing min 99.75% Si; 0.75c for max 1.25% Fe grades analyzing min 96.75% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy; ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (1 to 2%). Contract, lump, carload 9.50c, per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Contract, carload, bulk 19.60c per lb of briquet, carload packed in box pallets 19.80c, in bags 20.70c; 3000 lb to c.l. in box pallets 21.00c; 2000 lb to c.l. in bags, 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot 2" x D, $4.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $4.30.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5.7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 20.00c per lb of alloy, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

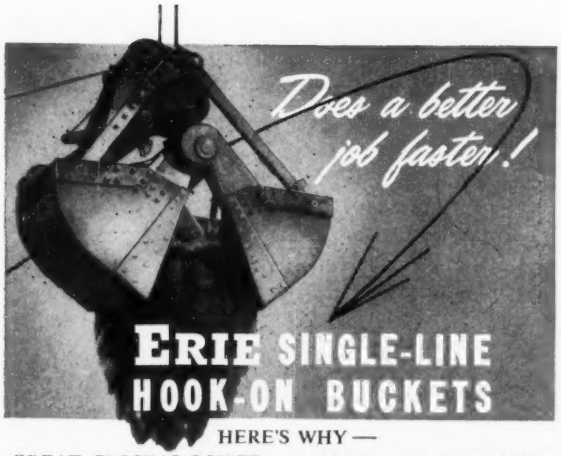
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $110 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa. $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.



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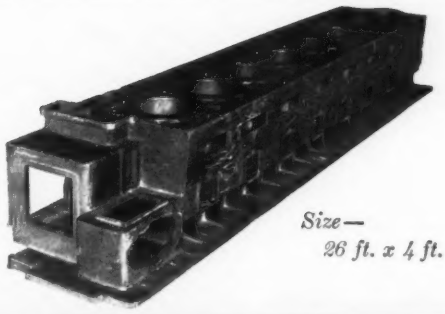

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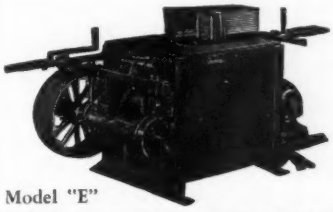

Model "E"

KARDONG BROTHERS, INC.

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ARE YOU OFFERING A SERVICE?

If your company performs plating, galvanizing, finishing or any one of dozens of metalworking operations on a contract basis, you can attract new customers by inserting an advertisement in the classified pages of STEEL.

not
Just "Another Forged Steel Shaft"
. . . . 93,334 Pounds of
Watchmaker's Precision
O.D. 24" finished to 125 micro inches.
O.D. 28.000" bearings 78-¾" long, finished to 32 micro inches tolerance +.000"—.001". Center 40" diameter finished to 125 micro inches.
Large size keyway machined in O.D. at center and each end.
8" diameter bore finished and polished to remove tool marks.

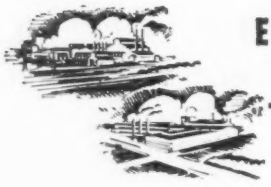
Here is the Main Turbine Shaft for a Hydraulic Turbine Generator to be installed in a power plant near San Francisco.

The shaft started as a 90 inch 240,000 lb. steel ingot. Our quality control men followed it from the open hearth to the forging press, through preliminary turning and boring—and after sonic testing, through heat treating to obtain physical properties in excess of these minimums:

Tensile Strength	95,000# P.S.I.
Yield Point	70,000# P.S.I.
Elongation	20%
Reduction of Area	45%

Close supervision followed through the machining operations where experienced craftsmen reduced the 240,000 lb. ingot to 93,334 lbs. of "Watchmaker's" Precision . . . From raw materials to finished product "Under One Responsibility and One Control". Your steel forging and steel casting requirements will receive the same careful quality control here . . . and your nearest Erie Forge & Steel field engineer will be calling on you soon.

AMERICA AND STEEL STEEL CENTENNIAL 1857 1957 MUST GROW TOGETHER



ERIE FORGE & STEEL CORPORATION

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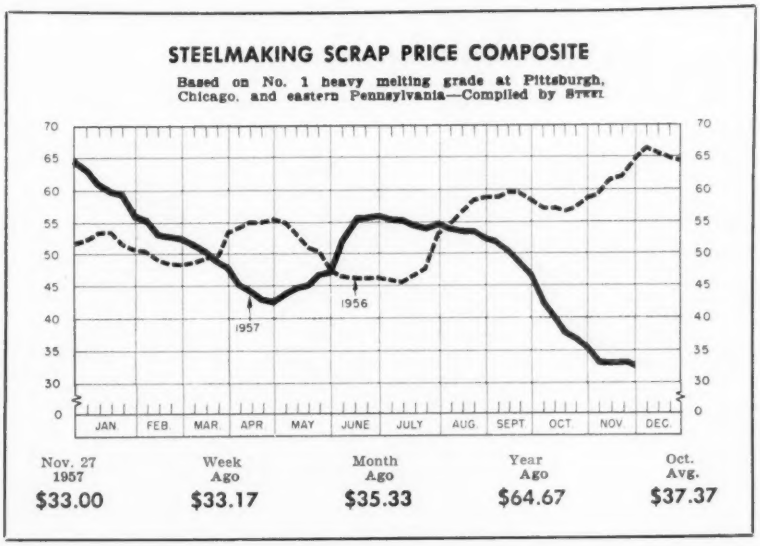

Scrap Prices Resuming Downtrend

Market stability is short-lived. STEEL's composite on the prime steelmaking grade declines 17 cents to $33 after holding unchanged the preceding week

Scrap Prices, Page 158

Philadelphia—Steel scrap buying is light and spotty, but prices are stabilized following the steady decline of recent weeks. No. 1 heavy melting is $33.50, with No. 1 bundles and busheling $1 higher. Electric furnace bundles are moving in small lots at $37, delivered. Scrap is not coming out in normal volume. Buying for export is slow. One vessel is loading tonnage bought some weeks back.

New York — Brokers' buying prices are steadier, and the movement of scrap against new orders is light. Borings and turnings are noticeably slow; so are the cast grades, with No. 1 cupola quoted at $38-$39, shipping point. Yards are not taking in their usual tonnage at the current low prices.

Including 1500 tons, No. 1 heavy melting steel, Panama Canal Co., closes Jan. 10 on 3200 net tons of steel scrap.

Chicago—Steel scrap prices here continue to sag, and important grades are off about $1 a ton on the average. Every market factor is of deflationary nature. Lack of consumer buying is the principal factor; it stems from a slowly declining steelmaking rate.

Inventories are substantial, and there is no interest in enlarging them. Hot metal is used more generously since blast furnace production exceeds demand for iron. Plenty of scrap is available. Depressing the market even farther is the fact that only a declining steelmaking rate is in prospect for the remainder of this year.

Pittsburgh—Several scrap dealers report improvement in number of inquiries, indicating customers are taking more interest in present prices. Inventory correction has not been completed; and it's unlikely that there will be any major purchases by leading consumers the rest of the year. But market observers think the price slump has largely been completed. Prices of No. 2 heavy melting and No. 2 bundles are firming slightly.

Cleveland—Pending the outcome of bids on automotive lists at the end of November, scrap marked time last week. Heavy auto tonnage is before the market, one seller offering 40,000 tons. Quoted prices are largely nominal. Factory bundles are off $1 on a number of broker bids on auto lists.

Detroit—Scrap sellers here have a pessimistic outlook. Dealers and brokers think prices will continue to drop following month-end closings on the auto lists. Brokers who bought for speculative purposes are particularly concerned. They'll have to pay personal property tax on scrap in their yards on Dec. 31. It is apt to depress the market more as brokers seek to unload at any price before the deadline.

Cincinnati — Prices are off another $1 here in anticipation of lower bids on industrial lists. It is expected that heavy tonnages will be offered by the auto plants at month's end.

St. Louis—Scrap continues dull with mills and foundries disinterested in purchases. Volume business is too low to make any price quotations firm.

Consumers' inventories are substantial in the light of current operating rates. Industrial scrap is coming out in better volume, but rural supplies are drying up.

Buffalo—Buying is almost completely lacking in the local scrap market. Prices are holding but the market undertone is soft. Deal-

(*Please turn to Page* 163)

WARD STEEL CO.
We specialize in
FINISHED STEEL
BARS—TUBES—STRIP
PROMPT WAREHOUSE SERVICE ONLY
Most Complete Stock in America of
BLUE TEMPERED SPRING STEEL
We believe that the way to sell is to carry a stock which permits satisfying any reasonable warehouse demand.
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Phone: Grovehill 6-2600

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Nov. 27, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 27	$33.00
Nov. 20	33.17
Oct. Avg.	37.37
Nov. 1956	61.83
Nov. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	*31.00-32.00*
No. 1 factory bundles	36.00-37.00
No. 1 dealer bundles	33.00-34.00
No. 2 bundles	*29.00-30.00*
No. 1 busheling	33.00-34.00
Machine shop turnings	17.00-18.00
Mixed borings, turnings	17.00-18.00
Short shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Cut structurals:	
2 ft and under	*37.00-38.00*
3 ft lengths	*36.00-37.00*
Heavy turnings	30.00-31.00
Punchings & plate scrap	*36.00-37.00*
Electric furnace bundles	*36.00-37.00*

Cast Iron Grades

No. 1 cupola	41.00-42.00
Stove plate	35.00-36.00
Unstripped motor blocks	28.00-29.00
Clean auto cast	44.00-45.00
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00-37.00*
Rails, 2 ft and under	*56.00-57.00*
Rails, 18 in. and under	*57.00-58.00*
Angles, splice bars	*50.00-51.00*
Rails, rerolling	*56.00-57.00*

Stainless Steel Scrap

18-8 bundles & solids	210.00-215.00
18-8 turnings	115.00-120.00
430 bundles & solids	95.00-100.00
430 turnings	50.00-55.00

CLEVELAND

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	22.00-23.00
No. 1 factory bundles	*30.00-31.00*
No. 1 bundles	28.00-29.00
No. 2 bundles	19.00-20.00
No. 1 busheling	28.00-29.00
Machine shop turnings	11.00-12.00
Short shovel turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut foundry steel	33.00-34.00
Cut structurals, plates 2 ft and under	35.00-36.00
Low phos. punchings & plate	29.00-30.00
Alloy free, short shovel turnings	21.00-22.00
Electric furnace bundles	29.00-30.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Charging box cast	33.00-34.00
Heavy breakable cast	29.00-30.00
Stove plate	36.00-37.00
Unstripped motor blocks	23.00-24.00
Brake shoes	30.00-31.00
Clean auto cast	37.00-38.00
Burnt cast	28.00-29.00
Drop broken machinery	40.00-41.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
R.R. malleable	49.00-50.00
Rails, 2 ft and under	55.00-56.00
Rails, 18 in. and under	56.00-57.00
Rails, random lengths	48.00-49.00
Cast steel	43.00-44.00
Railroad specialties	46.00-47.00
Uncut tires	39.00-40.00
Angles, splice bars	46.00-47.00
Rails, rerolling	54.00-55.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	205.00-210.00
18-8 turnings	90.00-95.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	31.00-32.00
Machine shop turnings	13.00-14.00
Short shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos.	33.00-34.00
Electric furnace bundles	33.00-34.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00

CHICAGO

No. 1 heavy melt., indus.	*33.00-34.00*
No. 1 hvy melt., dealer	30.00-31.00
No. 2 heavy melting	29.00-30.00
No. 1 factory bundles	*35.00-36.00*
No. 1 dealer bundles	*30.00-31.00*
No. 2 bundles	20.00-21.00
No. 1 busheling, indus.	*33.00-34.00*
No. 1 busheling, dealer	30.00-31.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	18.00-19.00
Short shovel turnings	18.00-19.00
Cast iron borings	18.00-19.00
Cut structurals, 3 ft.	*38.00-39.00*
Punchings & plate scrap	*39.00-40.00*

Cast Iron Grades

No. 1 cupola	35.00-36.00
Stove plate	*33.00-34.00*
Unstripped motor blocks	27.00-28.00
Clean auto cast	*39.00-40.00*
Drop broken machinery	*39.00-40.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*35.00-36.00*
R.R. malleable	45.00-46.00
Rails, 2 ft and under	*48.00-49.00*
Rails, 18 in. and smaller	*49.00-50.00*
Angles, splice bars	46.00-47.00
Axles	*48.00-49.00*
Rails, rerolling	*47.00-49.00*

Stainless Steel Scrap

18-8 bundles & solids	205.00-215.00
18-8 turnings	105.00-115.00
430 turnings & solids	80.00-90.00
430 turnings	50.00-55.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	21.00-22.00
No. 2 heavy melting	18.00-19.00
No. 1 bundles	23.00-24.00
No. 2 bundles	18.00-19.00
No. 1 busheling	21.00-22.00
Machine shop turnings	8.00-9.00
Mixed borings, turnings	9.00-10.00
Short shovel turnings	10.00-11.00
Punchings & plate scrap	27.00-28.00

Cast Iron Grades

No. 1 cupola	31.00
Stove plate	25.00
Charging box cast	25.00
Heavy breakable	24.00
Unstripped motor blocks	15.00†
Clean auto cast	33.00
Malleable	34.00†

†Nominal

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	37.00
No. 2 heavy melting	34.00
No. 1 bundles	37.00
No. 2 bundles	26.00
No. 1 busheling	37.00
Machine shop turnings	17.00
Short shovel turnings	19.00

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	35.00
Heavy breakable cast	35.00
Unstripped motor blocks	35.00
Brake shoes	40.00
Clean auto cast	43.00
Stove plate	38.00

Railroad Scrap

No. 1 R.R. heavy melt.	*36.25*
Rails, 18 in. and under	50.00
Rails, random lengths	45.00
Rails, rerolling	*51.00*
Angles splice bars	47.00

PHILADELPHIA

No. 1 heavy melting	33.50
No. 2 heavy melting	30.50
No. 1 bundles	34.50
No. 2 bundles	24.50
No. 1 busheling	34.50
Electric furnace bundles	37.00
Mixed borings, turnings	22.50
Short shovel turnings	24.00
Machine shop turnings	22.00†
Heavy turnings	30.50
Structurals & plate	42.00-43.00
Couplers, springs, wheels	46.00
Rail crops, 2 ft & under	63.00-65.00

Cast Iron Grades

No. 1 cupola	39.00
Heavy breakable cast	38.00
Malleable	57.00
Drop broken machinery	50.00-51.00

†Nominal

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	33.50
No. 2 heavy melting	29.00-30.00
No. 1 bundles	33.50
No. 2 bundles	21.00-22.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	13.00-14.00
Short shovel turnings	15.00-16.00
Low phos. (structurals & plate)	45.00-46.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Unstripped motor blocks	32.00
Heavy breakable	33.00-34.00

Stainless Steel

18-8 sheets, clips, solids	160.00-165.00
18-8 borings, turnings	55.00-60.00
430 sheets, clips, solids	65.00-70.00
410 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	20.00-21.00
No. 1 bundles	23.00-24.00
No. 2 bundles	12.50-14.00
No. 1 busheling	23.00-24.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Short shovel turnings	12.00-13.00
No. 1 cast	33.00-34.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast	35.00-36.00

BUFFALO

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	32.00-33.00
No. 2 bundles	27.00-28.00
No. 1 busheling	32.00-33.00
Mixed borings, turnings	18.00-19.00
Machine shop turnings	16.00-17.00
Short shovel turnings	20.00-21.00
Cast iron borings	18.00-19.00
Low phos.	37.00-38.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*37.00-38.00*
No. 1 machinery	*42.00-43.00*

Railroad Scrap

Rails, random lengths	44.00-45.00
Rails, 3 ft and under	51.00-52.00
Railroad specialties	37.00-38.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	*24.00-25.00*
No. 1 bundles	*29.00-30.00*
No. 2 bundles	20.00-21.00
No. 1 busheling	*29.00-30.00*
Machine shop turnings	*14.00-15.00*
Mixed borings, turnings	*17.00-18.00*
Short shovel turnings	*17.00-18.00*
Cast iron borings	*17.00-18.00*
Low phos. 18 in.	*36.00-37.00*

Cast Iron Grades

No. 1 cupola	35.00-36.00
Heavy breakable cast	32.00-33.00
Charging box cast	32.00-33.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00
Rails, 18 in. and under	54.00-55.00
Rails, random lengths	44.00-45.00

BIRMINGHAM

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
No. 1 busheling	31.00-32.00
Cast iron borings	15.00-16.00
Short shovel turnings	21.00-22.00
Machine shop turnings	20.00-21.00
Bar crops and plates	38.00-39.00
Structurals & plate	38.00-39.00
Electric furnace bundles	35.00-36.00
Electric furnace:	
3 ft and under	33.00-34.00
2 ft and under	34.00-35.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Stove plate	47.00-48.00
Unstripped motor blocks	35.00-36.00
Charging box cast	22.00-23.00
No. 1 wheels	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.60
Rails, 18 in. and under	49.00-50.00
Rails, rerolling	50.00-51.00
Rails, random lengths	41.00-42.00
Angles, splice bars	40.00-41.00

SEATTLE

No. 1 heavy melting	*34.00†*
No. 2 heavy melting	*32.00†*
No. 1 bundles	*33.00†*
No. 2 bundles	*25.00†*
Machine shop turnings	26.00†
Mixed borings, turnings	26.00†
Electric furnace No. 1	46.00

Cast Iron Grades

No. 1 cupola	35.00†
Heavy breakable cast	32.00†
Unstripped motor blocks	27.00†
Stove plate (f.o.b. plant)	25.00†

†Nominal

LOS ANGELES

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	38.00
No. 2 bundles	30.00
Machine shop turnings	20.00
Shoveling turnings	25.00
Cast iron borings	25.00
Cut structurals and plate 1 ft and under	54.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	52.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

SAN FRANCISCO

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 1 bundles	34.00
No. 2 bundles	26.00
Machine shop turnings	20.00
Mixed borings, turnings	20.00
Cast iron borings	20.00
Heavy turnings	20.00
Short shovel turnings	20.00
Cut structurals, 3 ft.	48.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	40.00
Stove plate	39.00
Heavy breakable cast	38.00
Unstripped motor blocks	36.00
Clean auto cast	47.00
No. 1 wheels	40.00
Drop broken machinery	47.00

HAMILTON, ONT.

No. 1 heavy melting	35.00
No. 2 heavy melting	30.00
No. 1 bundles	35.00
No. 2 bundles	25.00
Mixed steel scrap	30.00
Mixed borings, turnings	20.00
Busheling, new factory:	
Prepared	35.00
Unprepared	29.00
Short steel turnings	24.00
Rails, rerolling	43.00

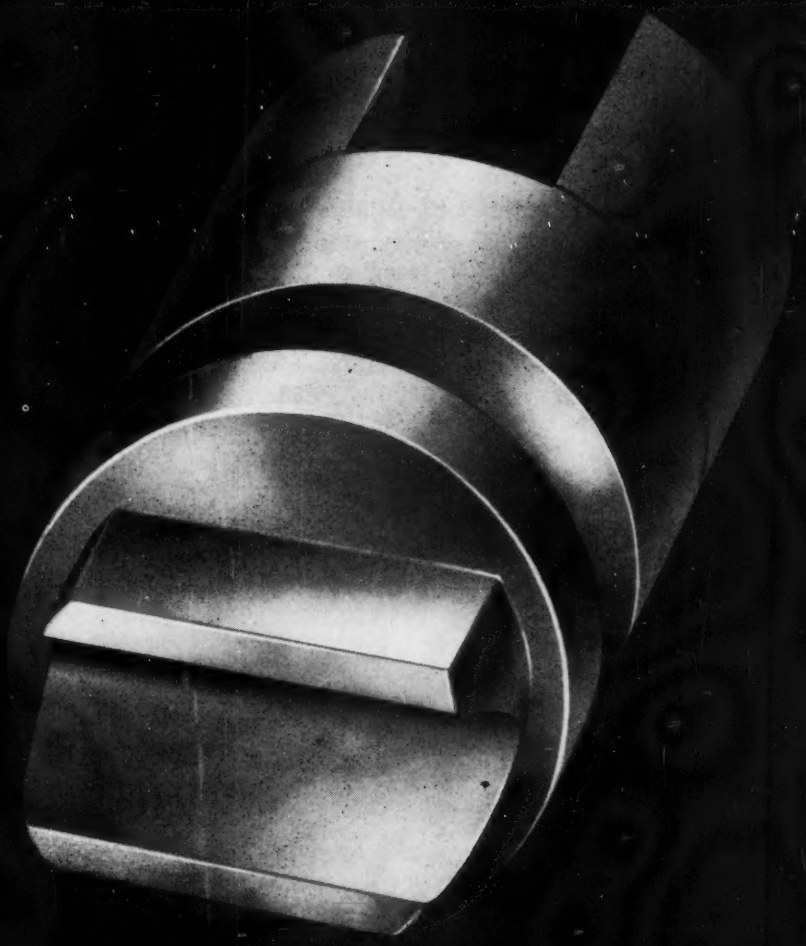
Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.

MACHINING PERFECTION always starts with the right steel

Pick exactly the right steel for any job from J & L's complete cold finished line



"Machines window pivot pins 35% faster with J & L C-1117 leaded steel"

Conversion to J&L "C-1117" leaded steel from regular "C-1117" steel cut total machining time 35% for this pivot pin used in linkage for turning quarter windows. Cycle time was cut from 3.5 to 2.6 seconds for this part machined from ⅜" cold finished round. J&L leaded steels give you higher cutting speeds, longer tool life, improved finish. Call your local distributor or write to Jones & Laughlin, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

J&L STEEL

Jones & Laughlin

. . . a great name in steel

Tariff Hearings End

Report should be ready by late winter. Commission expected to recommend higher lead and zinc duties but oppose import quotas. Custom smelted copper falls to 25 cents

Nonferrous Metal Prices, Pages 162 & 163

HEARINGS on increased duties for lead and zinc imports ended last week at U. S. Tariff Commission headquarters in Washington. Status quo and higher tariff forces unleashed salvos of facts, figures, and predictions.

When—Now that about 50 industry spokesmen have had their say, it's up to the commission. Washington sources believe it will be late winter or early spring before the commission's report is sent to the President. Such time consumers as the Christmas holidays, the 30-day period allowed for the filing of briefs, and staff analysis still stand in the way.

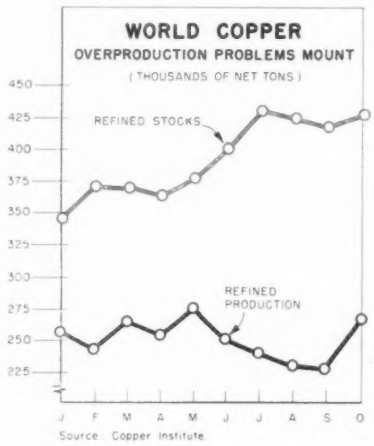
The betting is the commission will vote for an increase in tariffs: 2.55 cents a pound for lead, 2.1 cents a pound for zinc. Present rates are 1.06 cents for lead, 0.7 cent for zinc. But it's felt the commissioners won't recommend establishing quotas. (In 1954 they went on record as being against them.)

Possibilities—In theory, the commission can submit any of three findings to the President: 1. That there is no injury and no need for a tariff adjustment. 2. A finding that injury is present and an adjustment needed. 3. A tie vote.

If the commission brings in a decision of no injury, the President's hands are tied as far as adjustment is concerned. But he has wide discretionary power if the majority favors an increase, or if there is a split vote. For example: A recommendation to raise tariffs could be accepted, rejected, or substantially altered by the President. In the case of an evenly divided vote, he could accept the recommendations of either side, reject both, or modify any proposed increase. Indications are that any recommendation to strengthen the domestic lead and zinc industry will be favorably received by the White House.

Copper Cut Again

Custom smelted copper fell to 25 cents a pound on Nov. 21, down one-half cent. It was the second half-cent cut in ten days.



A further decline would surprise no one since it's doubtful if the latest reduction will boost demand substantially.

The big question is whether primary copper can sustain a price 2 cents a pound above the custom smelters' quotation. (Primary has been at 27 cents since Sept. 3.) Most metalmen believe primary producers will have to chop their price by at least 1 cent a pound unless custom smelters come back up or demand improves substantially. Neither condition appears likely.

Other minus factors: 1. The LME is hovering at 23 cents a pound. 2. Katanga copper has been cut to 23.6 cents a pound, c.i.f New York.

The pricing situation is of concern in world capitals. Rumor has it that the Chilean government is trying to negotiate with other countries to establish a world price. Though the movement reportedly has many supporters, it's doubtful if any such agreement could ever be reached.

Market Memos

- Aluminum Co. of America has set up a new marketing group to stimulate sales to the mobile home industry.
- Ingot brass and bronze shipments in October hit 22,800 tons, reports the Defense Council of the Ingot Brass & Bronze Industry. This compares with the September figure of 19,670.
- The Panamanian government has signed a contract with Kaiser Aluminum & Chemical Corp. granting the company exclusive rights to explore for and mine bauxite in the western areas along the Costa Rican border.
- Magnesium casting shipments totaled 12,343 tons in the first nine months, compared with 13,520 tons in the same period last year.

NONFERROUS PRICE RECORD

	Price Nov. 26	Last Change	Previous Price	Oct. Avg	Sept. Avg	Nov., 1956 Avg
Aluminum ..	26.00	Aug. 1, 1957	25.00	26.000	26.000	25.000
Copper	25.00–27.00	Nov. 21, 1957	25.50–27.00	26.361	26.469	35.956
Lead	13.30	Oct. 14, 1957	13.80	13.504	13.800	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	64.500
Tin	87.50	Nov. 26, 1957	87.125	91.843	93.422	111.049
Zinc	10.00	July 1, 1957	10.50	10.000	10.000	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.

You get speedier service from the

ZINC ZONE

Central location of American Zinc plants assures prompt deliveries of slab zinc to any point in the nation.

HILLSBORO, ILL., PLANT
Prime Western, Brass Special, Intermediate, High Grade, Continuous Galvanizing Grades
MONSANTO, ILL., ELECTROLYTIC PLANT
Special High Grade, High Grade, Continuous Galvanizing Grades, Special Shapes
FORT SMITH, ARK., SMELTER
Prime Western, Brass Special
DUMAS, TEXAS, SMELTER
Prime Western, Brass Special, Continuous Galvanizing Grades

PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
METALLIC CADMIUM
SULPHURIC ACID
LEAD-FREE and LEADED ZINC OXIDES
ZINC CARBONATE
GERMANIUM DIOXIDE
AGRICULTURAL LIMESTONE
CRUSHED STONE

American Zinc Sales Company

Distributors for AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, Ohio • Chicago • St. Louis • New York • Detroit • Pittsburgh

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 31.30; No. 241, 31.50; No. 356, 29.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.50-26.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per ton, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100 lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $120 per lb, nom.

Copper: Electrolytic, 27.00 deld.; custom smelters, 25.00; lake, 27.00 deld.; fire refined, 26.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $80-110 nom. per troy oz.

Lead: Common, 13.30; chemical, 13.40; corroding, 13.40, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots, $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire, $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $225-230 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter, 71.25 per lb of nickel content before 1 cent freight allowance, f.o.b. Copper Cliff, Ont.

Osmium: $80-100 per troy oz nom.

Palladium: $21-24 per troy oz.

Platinum: $81-87 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $7.50 per lb, commercial grade.

Silver: Open market, 90.00 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 87.50.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.25; grade A-2 (0.5% Fe max.), $2.00 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.50 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.10-4.20.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 11.35; special high grade, 11.75 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 15.25; No. 5, 14.75 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.75-30.25; No. 12 foundry alloy (No. 2 grade), 21.75-23.00; 5% silicon alloy, 0.60 Cu max., 25.50-26.00; 13 alloy, 0.60 Cu max., 25.50-26.00; 195 alloy, 24.75-26.75; 108 alloy, 22.25-23.00. Steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 23.75; grade 2, 22.00; grade 3, 20.75; grade 4, 19.00.

Brass Ingot: Red brass, No. 115, 27.25; tin bronze, No. 225, 36.00; No. 245, 30.75; high-leaded tin bronze, No. 305, 31.25; No. 1 yellow, No. 405, 22.75; manganese bronze, No. 421, 24.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.82, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 32.355; l.c.l., 32.98. Weatherproof, 30,000-lb lots, 33.66; l.c.l., 34.78. Magnet wire deld., 40.43, before quantity discounts.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $19.00 per cwt; pipe, full coils, $19.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-11.50; wire, $7.50-11.50; forging billets, $6.00-7.60; hot-rolled and forged bars, $6.15-7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 20.50; plates 19.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.00-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.136	43.10-47.60	.....
0.135-0.096	43.60-48.70	40.50-41.10
0.095-0.077	44.30-50.50	40.60-41.30
0.076-0.061	44.90-52.80	40.80-42.00
0.060-0.048	45.60-55.10	41.40-43.10
0.047-0.038	46.20-57.90	41.90-44.50
0.037-0.030	46.60-62.90	42.30-46.30
0.029-0.024	47.20-54.70	42.60-47.00
0.023-0.019	48.20-58.10	43.70-45.40
0.018-0.17	49.00-55.40	44.30-46.00
0.016-0.015	49.90-56.30	45.10-46.80
0.014	50.90	46.10-47.80
0.013-0.012	52.10	46.80
0.011	53.10	48.00
0.010-0.0095	54.60	49.40
0.009-0.0085	55.90	50.90
0.008-0.0075	57.50	52.10
0.007	59.00	53.60
0.006	60.60	55.00

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.70	47.50
5050-F	43.50	48.60
3004-F	44.80	50.50
5052-F	45.40	51.20
6061-T6	46.90	53.00
2024-T4*	50.60	57.40
7075-T6*	58.40	66.00

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	78.20	75.20	....	....
0.156-0.172	66.20	63.40	....	....
0.188	66.20	63.40	....	81.60
0.219-0.234	63.00	61.50	....	....
0.250-0.281	63.00	61.50	....	77.90
0.313	63.00	61.50	....	74.20
0.344	62.50	....	....	....
Cold-Finished				
0.375-0.547	62.50	61.30	74.80	69.80
0.563-0.688	62.50	61.30	71.10	65.50
0.719-1.000	61.00	59.70	64.90	61.70
1.063	61.00	59.70	....	59.60
1.125-1.500	58.60	57.40	62.80	59.60
Rolled				
1.563	57.00	55.70	....	....
1.625-2.000	56.30	54.90	....	57.50
2.125-2.500	54.80	53.40	....	....
2.563-3.375	53.20	51.70	....	....

Forging Stock: Round, Class 1, 45.20-58.60 in specific lengths, 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 50.50-66.60 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$19.40	2	$ 59.90
1	30.50	4	165.05
1¼	41.30	6	296.10
1½	49.40	8	445.55

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.40-47.00	60.60-64.80
12-14	45.70-47.20	61.30-65.80
15-17	45.90-47.90	62.50-67.50
18-20	46.50-48.30	64.50-70.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, .25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.50-14.00; old sheets, 10.50-11.00; borings and turnings, 6.50-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	SCRAP ALLOWANCES f Clean Heavy	Rod Ends	Clean Turnings
Copper	50.13b	47.36c	....	50.32	23.000	23.000	22.250
Yellow Brass	44.02	32.30d	44.56	46.93	17.375	17.125	15.750
Low Brass, 80%	46.50	46.44	47.04	49.31	19.500	19.250	18.750
Red Brass, 85%	47.37	47.31	47.91	50.18	20.250	20.000	19.500
Com. Bronze, 90%	48.78	48.72	49.32	51.34	21.000	20.750	20.000
Manganese Bronze	52.01	46.11	56.61	....	16.125	15.875	15.375
Muntz Metal	46.39	42.20	....	....	16.375	16.125	15.625
Naval Brass	48.27	42.58	55.33	51.68	16.125	15.875	15.375
Silicon Bronze	54.76	53.95	54.80	56.74e	22.625	22.375	21.625
Nickel Silver, 10%	60.43	62.75	62.75	....	23.625	23.375	11.813
Phos. Bronze, A-5%	69.07	69.57	69.57	70.75	23.750	23.500	22.500

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, or any or all kinds of scrap, add 1 cent per lb.

7.00; crankcases, 10.50-11.00; industrial castings, 10.50-11.00.

Copper and Brass: No. 1 heavy copper and wire, 18.75-19.25; No. 2 heavy copper and wire, 16.75-17.25; light copper, 14.50-15.00; No. 1 composition red brass, 15.00-15.50; No. 1 composition turnings, 14.50-15.00; new brass clippings, 13.00-13.50; light brass, 9.00-9.50; heavy yellow brass, 11.00-11.50; new brass rod ends, 12.00-12.50; auto radiators, unsweated, 11.50-12.00; cocks and faucets, 12.00-12.50; brass pipe, 12.50-13.00.

Lead: Heavy, 8.50-9.00; battery plates, 4.00-4.25; linotype and stereotype, 10.50-11.00; electrotype, 9.50-10.00; mixed babbitt, 10.50-11.00.

Monel: Clippings, 30.00-32.00; old sheets, 29.00-30.00; turnings, 23.00-24.00; rods 30.00-32.00.

Nickel: Sheets and clips, 42.00-47.00; rolled anodes, 42.00-47.00; turnings, 40.00-42.00; rod ends, 42.00-47.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 2.75-3.00; old diecast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 16.50-17.50; 3003 clippings, 16.50-17.50; 6151 clippings, 16.00-17.50; 5052 clippings, 16.00-17.00; 2014 clippings, 15.50-17.00; 2017 clippings, 15.50-17.00; 2024 clippings, 15.50-17.00; mixed clippings, 15.00-16.00; old sheets, 13.50; old cast, 13.50; clean old cable (free of steel), 16.00-16.50; borings and turnings, 13.50-15.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 53.00; light scrap, 48.00; turnings and borings, 33.00.

Copper and Brass: No. 1 heavy copper and wire, 21.50; No. 2 heavy copper and wire, 19.50; light copper, 17.25; refinery brass (60% copper) per dry copper content, 19.25.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 21.50; No. 2 heavy copper and wire, 19.50; light copper, 17.25; No. 1 composition borings, 18.25; No. 1 composition solids, 18.75; heavy yellow brass solids, 13.00; yellow brass turnings, 12.00; radiators, 14.75.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 45.29; oval, 43.50, 5000-10,000 lb; electrodeposited, 35.75, 2000-5000 lb lots; cast, 36.25, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 10-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 105.50; 200-499 lb, 104.00; 500-999 lb, 103.50; 1000 lb or more, 103.00.

Zinc: Balls, 17.50; flat tops, 17.50; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.

Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30; f.o.b. Detroit.

Copper Cyanide: 100-200 lb, 71.60; 300-900 lb, 69.60.

Copper Sulphate: 100-1900 lb, 14.55; 2000-5900 lb, 12.55; 6000-11,900 lb, 12.30; 12,000-22,900 lb, 12.05; 23,000 lb or more, 11.55.

Nickel Chloride: Less than 400 lb, 35.00; 400-9990 lb, 33.00; 10,000 lb, 32.50.

Nickel Sulphate: 5000-22,000 lb, 33.50; 23,000-35,900 lb, 33.00; 36,000 lb or more, 32.50.

Sodium Cyanide: 100 lb, 27.60; 200 lb, 25.90; 400 lb, 22.90; 1000 lb, 21.90; f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 71.50; 100-600 lb, 62.80; 700-1900 lb, 60.10; 2000-9900 lb, 58.20; 10,000 lb or more, 56.90.

Stannous Chloride (anhydrous): Less than 25 lb, 160.40; 25 lb, 124.50; 100 lb, 110.40 400 lb, 108.00; 5200-19,600 lb, 95.80; 20,000 lb or more, 83.60.

Stannous Sulphate: Less than 50 lb, 123.50; 50 lb, 93.50; 100-1900 lb, 91.50; 2000 lb or more, 89.50.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 157*)

ers, awaiting placement of December business, think prices may drop another $2 a ton. Cast scrap is off $2, cupola now being quoted $38 and No. 1 machinery cast $43.

Birmingham—The scrap market here continues slow with only a few sales, principally cast grades, reported. A check of mills indicates little likelihood of a pickup in buying the remainder of this year.

Opinions of brokers differ on the price outlook. Some think quotations will go lower; others think they are bumping bottom.

San Francisco—The steel scrap market is marking time. Shipments slowed down further last week because of the Thanksgiving Day observance. Prices are unchanged.

Washington—Stocks of ferrous materials (scrap and pig iron) totaled 11,185,000 gross tons at the end of September, reports the U. S. Bureau of Mines. Of the total, 7,942,000 tons were scrap, 3,243,000

METALLURGICAL ENGINEERS

With experience in investigation and analysis of mechanical failures, shop methods, processes and devices employed in the manufacture of parts for heavy duty earth-moving equipment; and metallurgical and heat-treating studies to evaluate materials, chemical properties and heat-treating specifications based on analyses of service performance.

Direct replies to:

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THE EIMCO CORPORATION
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MELTER

Need melter with stainless steel background. Induction melting facilities 30 to 2000 lbs. capacity.
Excellent opportunity to grow with aggressive young company in suburban Milwaukee area.
Reply Box 622, STEEL
Penton Bldg. Cleveland 13, Ohio

CLASSIFIED

Help Wanted

CLEANING ROOM SUPERINTENDENT: Must have supervisory experience and be completely familiar with all phases of cleaning room operations for a miscellaneous steel jobbing foundry producing castings up to 10,000 pounds. Excellent opportunity for an aggressive qualified man with a modern and progressive foundry located in the Middle West producing 600-700 tons per month. Advise full particulars including salary requirements. Box 603, STEEL, Penton Bldg., Cleveland 13, Ohio.

STEEL MILL SUPERINTENDENT for small plant consisting of electric furnace and Merchant Mill. Must have experience all phases. Southern location. Give complete account of experience, references and salary anticipated. Write Box 624, STEEL, Penton Bldg., Cleveland 13, Ohio.

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Canadian Metalworking plant, central Canada, available for lease (or sale) to reputable U. S. firm. Exceptional opportunity for concern contemplating Canada to avoid capital outlay, startup and personnel problems, by acquiring a going concern by lease; small, but well equipped and with extremely competent production staff. Experienced machining and fabricating in precision aircraft and ordnance fields. Current field of operations (aircraft, ordnance, aluminum boats) can be maintained, expanded, or eliminated to suit your requirements. Approx. $250,000 worth equipment (hand and automatic turning, milling, press, welding, treating, etc.) in 8,000 sq. feet plus brick building. This advertisement by principals—no fees or commissions involved.

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175 TRANSFORMERS
1.5 to 1000 KVA
Current listing
sent upon request
GENERAL METALS
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NEW MOTORS AVAILABLE: Over 5,000 new motors, in stock, from ¼ HP to 200 HP. Special low prices. Write, wire or phone collect!

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PELS IRONWORKER'S SHEAR MOD. EFF35 shear 3⅜ Rd; 3" Sq; 6x2; 8x1¼ Flats; 8x8x¾ Angles; 12x35# Channels; Factory motorized. Reasonably priced. WEIDEMANN TURRET PUNCH MOD. 10-B 12 Sta.
SEABOARD STEEL CO., INC.
New Haven, Conn.

FOR SALE
Pig Machine—Conveyor type motorized pig machine. Pours 25—40# steel pigs. Details on request.
CRUCIBLE STEEL CASTING COMPANY
2859 So. 20th St.
Milwaukee 15, Wis.

MANUFACTURERS REPRESENTATIVE
AAA-1 company interested in experienced stainless steel casting representation in New York, East Coast area. Straight commission. Write at once giving complete resume.
Box 623, STEEL
Penton Bldg. Cleveland 13, Ohio

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pig iron. Stocks of both registered new highs, scrap being up 6 per cent and pig iron 5 per cent from the totals reported at the end of August.

Domestic consumption during September totaled 5,034,000 tons of scrap (down 5 per cent from August), and 5,646,000 tons of pig iron (down 3 per cent). The total melt (10,680,000 tons) consisted of 47 per cent scrap and 53 per cent pig iron, compared with 48 and 52 per cent in August.

Scrap for consumption (home production plus purchases) in September amounted to 5,482,000 gross tons, a decrease of 5 per cent from August. Home scrap accounted for 3,193,000 tons, and purchases 2,289,000. Of the purchased material, 84 per cent was received from dealers, 16 per cent from other sources.

Los Angeles—Scrap prices are unchanged, but absence of mill buying continues. Collections have virtually stopped. Most dealers report plentiful supplies.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 153

U. S. Steel Corp. will discontinue operations at its Joliet, Ill., coke plant March 1, after a half century of service. First ovens of the plant were put in operation in 1908 to complete integration of the then Joliet Works of the Illinois Steel Co. Originally, there were four batteries of ovens, but in 1952 No. 3 battery was shut down.

Iron Ore . . .

Iron Ore Prices, Page 153

Shipments of Lake Superior iron ore totaled only 492,964 gross tons in the week ended Nov. 25, reports the American Iron Ore Association. In the like week a year ago 1,866,960 tons were moved.

With the lake shipping season rapidly coming to a close, shipments of ore from the upper lakes to Nov. 25 total 84,439,976 tons—up 9,439,976 tons from the 74,873,061 tons moved to the like date in 1956.

Shipments have been completed for the season at all U. S. lake ports except Escanaba and Marquette, Mich. Ore is still moving through Michipicoten in Canada.

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HOTEL CLEVELAND

Cleveland Room
Dine in the splendid old world setting of a grand dining room. The menu is varied, the service unexcelled.

Bronze Room
One of the brightest of the city's supper clubs. Dancing nightly from 9:00 p.m.
Air conditioned, of course.

Rib Room
A true specialty restaurant
For Fabulous Roast Beef, roasted, carved and served to your order.

MEN'S BAR
Strictly stag — is this all male haven for good drinks, good food and good talk.
Plus sports events on TV.

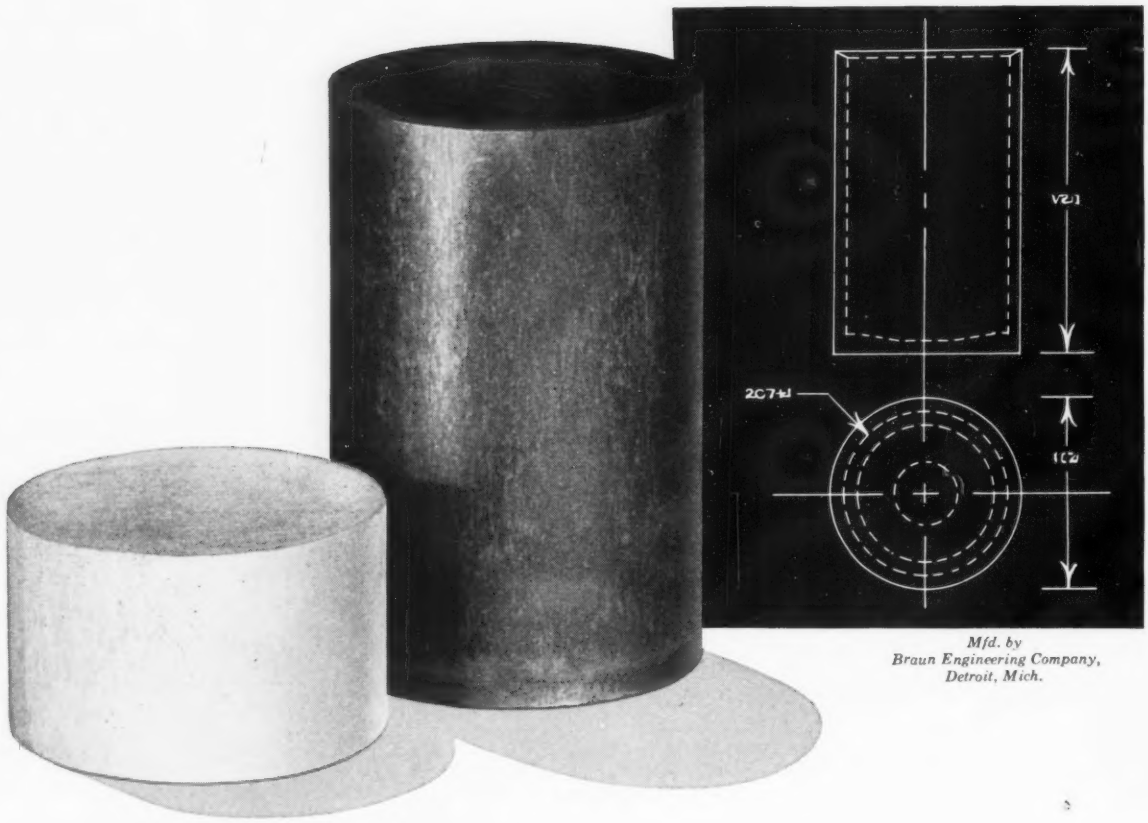
TRANSIT BAR
For *rapid* service in the most unique bar in the country . . . decorated with an outstanding collection of miniature trains.

the PATIO
Pause — in the relaxing, informal atmosphere of the gayly decorated Patio. It's a Cleveland habit to say — "Meet me at the Patio."

Coffee Shop
Service is brisk and decor cheerful in the modern, air-conditioned coffee shop. Enjoy a tasty sandwich or a moderately priced meal.

Hotel Cleveland
CLEVELAND, OHIO

WRITE OR CALL FOR YOUR RESERVATIONS NOW



Mfd. by
Braun Engineering Company,
Detroit, Mich.

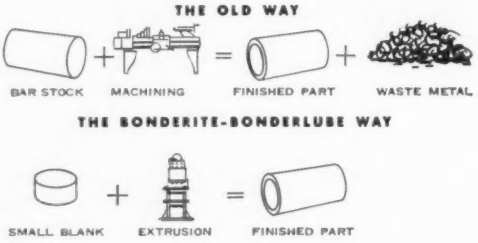
EXTRUDED... *and sold for less than the raw stock used to cost!*

Cold extrusion of steel means big reductions in material, machinery, and time. Frequently, as in the case of the automotive motor mount above, the part is made by cold extrusion for about the cost of the raw metal used in conventional methods.

More and more, manufacturers are turning to cold extrusion as a cost cutting, simplified method of making quality parts. Machining is cut to a bare minimum and scrap virtually disappears. "Impossible" jobs are being mass produced at high rates and a lot of the "impossibles" have become production runs only because of Bonderite and Bonderlube.

These two remarkable aids in cold extrusion make metal flow like magic. More severe deformations are possible. Tool and die life are multiplied. Rejected parts are few and far between. Production speeds are greatly increased. Smooth finishes are easily achieved and maintained.

The Parker cold forming staff can give you expert help in the technique of cold extrusion.



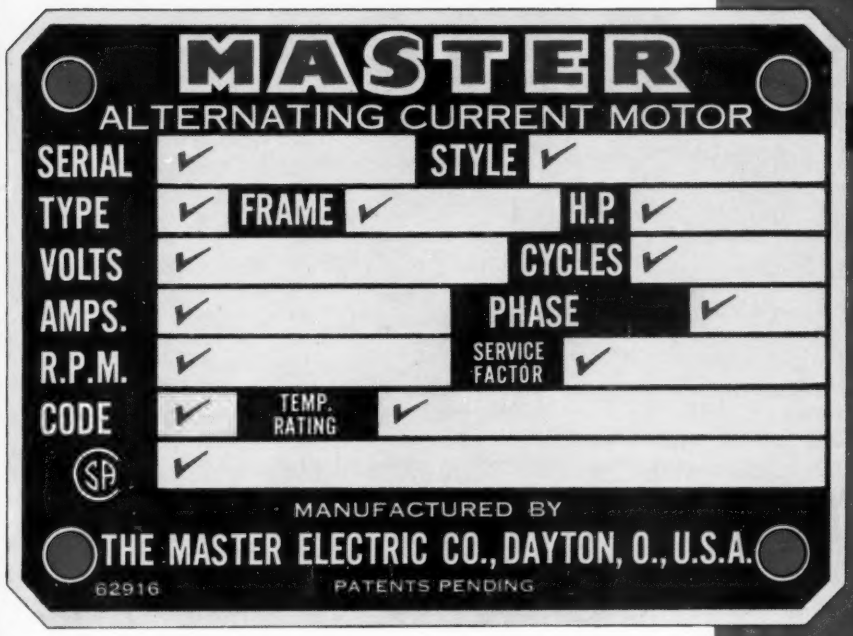
Since 1914— leader in the field

PARKER RUST PROOF COMPANY
2158 E. MILWAUKEE, DETROIT 11, MICHIGAN

BONDERITE	BONDERITE and BONDERLUBE	PARCO COMPOUND	PARCO LUBRITE	TROPICAL
corrosion resistant paint base	aids in cold forming of metals	rust resistant	wear resistant for friction surfaces	heavy duty maintenance paints since 1883

**Bonderite, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.*

Write your own ticket—



What are your power drive requirements? Here at Master, with the widest selection in the nation to choose from, you're sure to fill your needs quickest and best.

Need something special in gear reduction—electric brakes—variable speed operation—fluid drive or special mounting? Or would some of our standard models (⅛ to 400 H.P.) fill the bill? You'll find the answer here! And remember, all Master components are engineered to form combinations of units in one streamlined, compact package of efficiency. Name your need and the name that fills it is Master—for greater salability of motor driven products; for increased productivity of plant equipment.

Motor Ratings..⅛ to 400 H.P. All phases, voltages and frequencies.

Motor Types.....Squirrel cage, slip ring, synchronous, repulsion-start induction, capacitor, direct current.

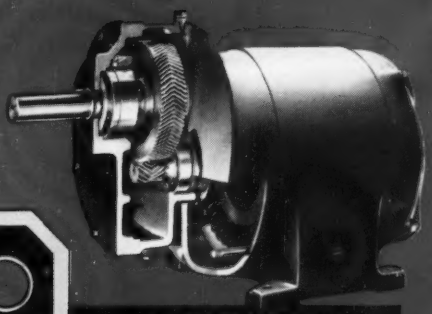
Construction ....Open, enclosed, splash-proof, fan-cooled, explosion-proof, special purpose.

Speeds .....Single speed, multi-speed, and variable speed.

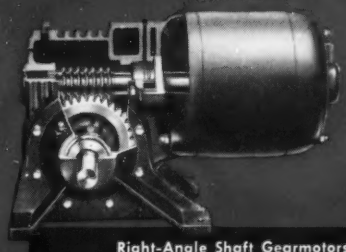
Installation .....Horizontal or vertical, with or without flanges and other features.

Power Drive Features .....Electric brakes (2 types)— 5 types of gear reduction up to 432 to 1 ratio. Mechanically and electronically-controlled variable speed units—fluid drives—every type of mounting.

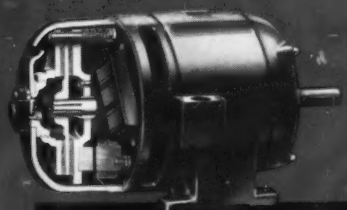
THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO



Parallel Shaft Gearmotors

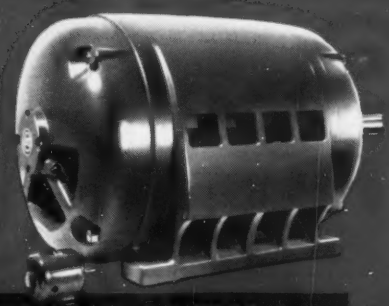


Right-Angle Shaft Gearmotors



Unibrake Motors

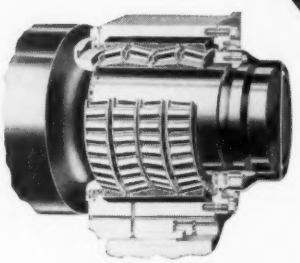
Speedrangers



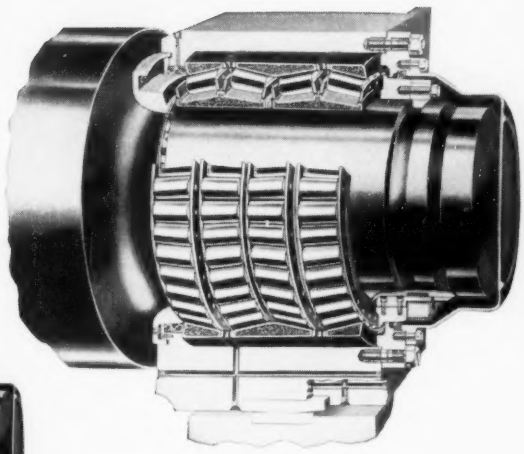
Standard Motors—⅛ to 400 H.P.

TIMKEN® bearings used on rolling mill roll necks

1933
45 mills



1950
317 mills



1957
689 mills

Look how this idea has grown in 24 years!

JUST 24 years ago—in 1933—there were 45 mills using Timken bearing-equipped stands. Today, 1,631 Timken bearing-equipped stands are used in 689 mills . . . more than fifteen times as many mills as in 1933.

Why has the idea of using Timken® tapered roller bearings on mill roll necks become so widely adopted? For all these reasons:

1. LOW BEARING COST. Tonnage records indicate that the long life of Timken roll neck bearings keeps bearing cost per ton of steel rolled to a minimum.

2. GREATER MILL RIGIDITY. Balanced proportion design of Timken bearings permits larger roll necks than ever before possible with tapered roller bearings.

3. ELIMINATION OF COMPLICATED LUBRICATING SYSTEMS. Timken bearings permit use of simple grease lubrication.

4. LOAD RATINGS INCREASED UP TO 40% due to Timken bearings' balanced proportion design.

5. NO SPECIAL THRUST BEARINGS NEEDED. Timken tapered roller bearings take both radial and thrust loads.

6. MILLS CAN BE STOPPED AND RESTARTED WITH NO LOSS OF STEEL. Timken bearings permit starting under full load.

7. HIGHER ROLLING MILL SPEEDS are possible because Timken bearings minimize friction.

8. PROLONGED ROLL LIFE is assured because Timken bearings provide maximum roll neck strength, less wear.

You can be sure of all these advantages in either existing or new equipment by specifying Timken tapered roller bearings for back-up and work rolls. Consult our roll neck bearing specialists for full details. Write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS ROLL THE LOAD